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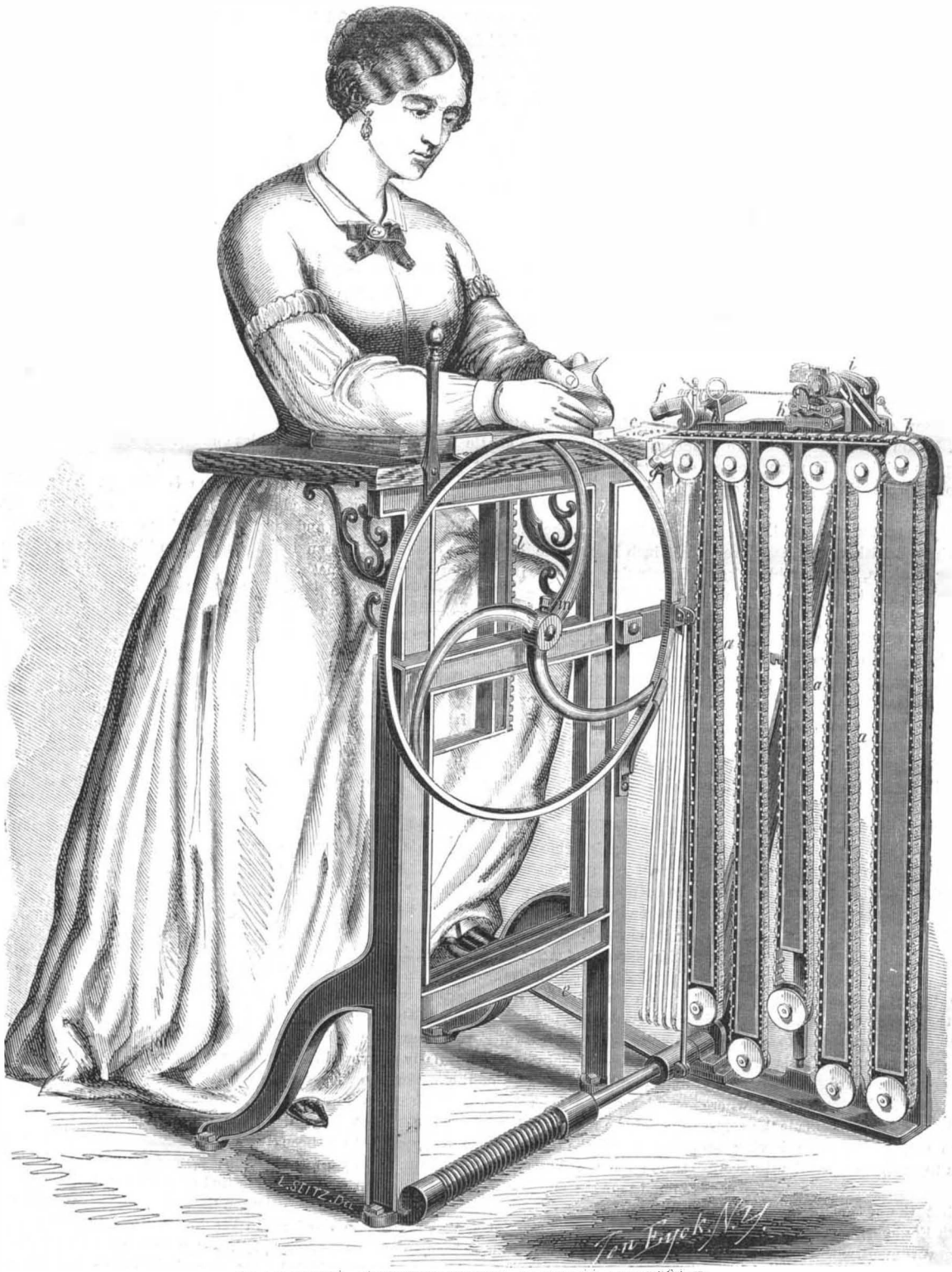
Improved Paging Machine.

There is a great deal of ingenuity displayed in the the construction of the machine illustrated by the accompanying engravings. It is designed for paging account books, and operates in the most rapid, accurate and perfectly successful manner. Copper type are formed on flat plates of brass which are hinged together to form a long endless chain, *a a a*. This chain is arranged in a vertical frame—passing round pulleys at the top and bottom, and along horizontal plate, *b*, so as to bring the several type plates in succession at the point, *c*, where the printing is performed. The book to be paged is laid upon the table, which is adjusted at the proper hight, the book being placed in such a position that the corners of the leaves will come over the type at the point, *c*. The operator turns the leaves up, holding them with the fingers, and allows one at a time to drop down upon the type; at the same time pressing down the treadle, *e*, which brings the cushion, *f*, down upon the corner of the leaf over the type with sufficient force to produce the impression.—The foot on the treadle is then raised, when a spring throws the treadle up, carrying the type chain along one link, and bringing the type of the second number forward to the point, *c*. This motion also turns the revolving finger, *c*, half over upon its short axis, thus bending down the corner of the leaf that has just been printed and bringing it below the type plate that has been carried forward beneath the horizontal bar, where at the next depression of the treadle, it is printed on the opposite side. Thus a leaf is printed on both sides at each depression of the treadle. The cushion, *f*, is pressed down upon the type by a toggle-jointed lever, which is actuated by an arm rising from the fulcrum of the treadle.

To prevent the freshly impressed ink from soiling the page, an endless belt of clean tape is carried under the cushion, *f*, and over the corresponding cushion below; this tape receiving a motion at each depression of the treadle sufficient to carry a clean portion under the cushion. The inking apparatus, *i*, is attached to the arm which rises from the fulcrum of the treadle, and is thus carried forward along the bar, *b*, at each motion of the treadle. The ink is contained in the cup, *j*, from the bottom of which it passes by a series of distributing rollers to the roller, *k*, which transfers it to the type. An elevation on the bar, *b*, holds the roller, *k*, clear of the type till it arrives in the vicinity of the point, *c*, when it is let down upon the type; thus printing only two or three of these near the printing point. The arm which actuates the toggle jointed lever is connected with the lever by a horizontal bar, which may be lifted from its hold upon the lever by pulling up a wire whenever it is desired to pass a page without printing it.

The table, *d*, upon which the book rests, is supported by a vertical rack, *l*, that meshes into a pinion upon the axle of the wheel, *m*, and at each motion of the treadle this wheel receives a slight turn, just sufficient to carry the table down a distance equal to the thickness of the paper; by which arrangement the paper that is being printed is kept constantly level with the type.

The introduction of the revolving finger, *c*, and of the self-operating downward movement of the table with the other modifications, greatly facilitate the work, and increase the amount that can be done by this machine in comparison with the invent-



M'ADAMS'S ACCOUNT-BOOK PAGING MACHINE.

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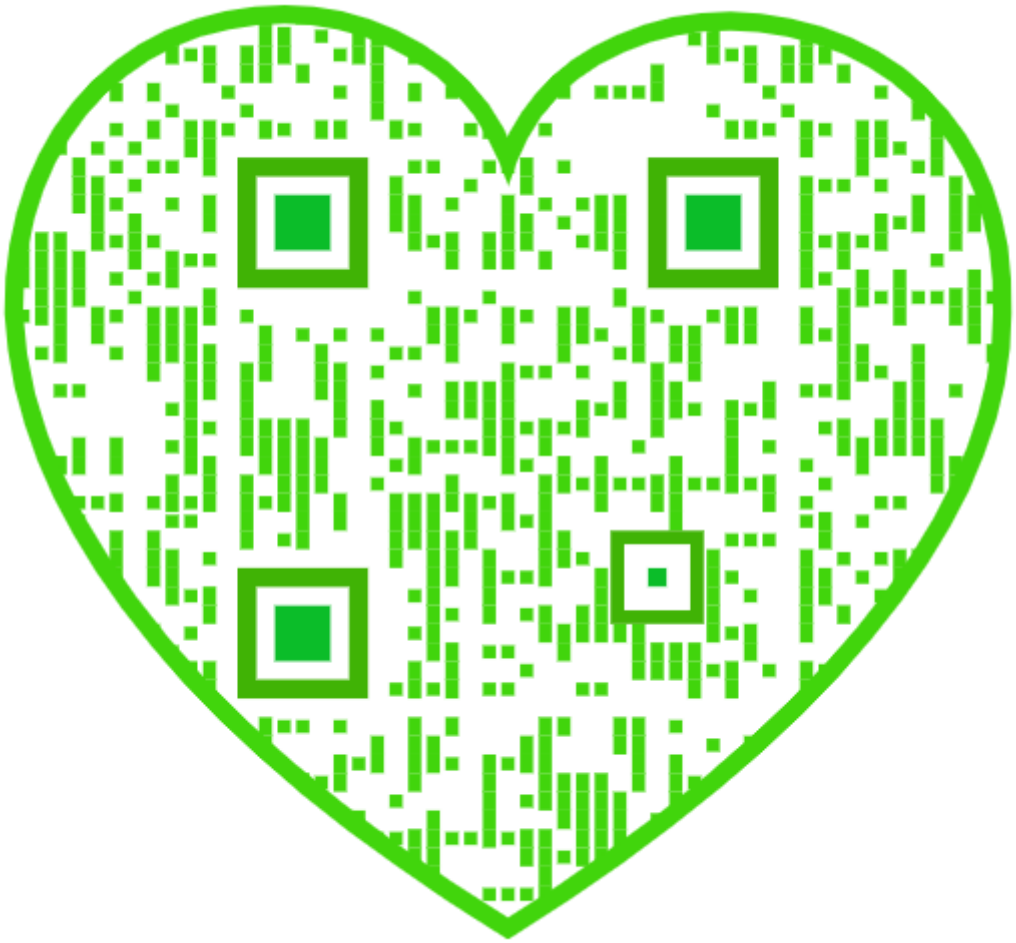

or's earlier machines which did not have these improvements; while the operation is far less laborious. By arranging two of the type frames in connection with one table, a machine is made to print four pages at each motion of the treadle. In this case the paper is paged before it is bound into books, and one workman will page about 90 reams per day. Such a machine is of course suitable for large establishments only. The inventor also makes a simpler and cheaper machine, for paging one side of the leaf only at a time.

This machine is the invention of John McAdams, who invented his first paging machine in 1851, and has been directing his attention since to various improvements, all of which are embraced in our illustratron.

Orders for either the single or double machines, or any inquiries in relation to the matter may be addressed to the inventor, at 44 Chatham street, New York.

NOTES ON MILITARY AND NAVAL AFFAIRS.

THE SITUATION.

The week ending Nov. 16th is made ever memorable in the history of our country. The news of the success of the great naval expedition in taking Port Royal, S. C., and the arrest of Messrs. Mason and Slidell on board the British steamer *Trent*, while on their way to Europe as Commissioners from the Confederate States, are events of thrilling interest to every loyal heart.

The facts concerning the taking of Beaufort harbor have been spread out in all their length and breadth in the daily press, and it is unnecessary to enter into details. Suffice it to say that the fleet, after a most terrific bombardment of Forts Walker and Beauregard, drove the enemy out in great confusion. The casualties on board the vessels were very slight, comparatively, only eight being killed and some twenty wounded. There are now 16,000 troops under Gen. Sherman upon the soil of South Carolina, and another expedition will soon sail from Annapolis and Fortress Monroe, probably to reinforce Gen. Sherman's column or to strike at some other point.

ARREST OF MASON AND SLIDELL.

The arrest of Messrs. Mason and Slidell, although a a subject in itself of great rejoicing, is nevertheless causing a good deal of apprehension. The general opinion, however, seems to be that, according to the highest British authority the act was justified. There are several examples where British vessels have overhauled vessels of other nations, and forcibly taken off persons who were engaged in treasonable schemes against the government. The facts of the arrest are simply these: The steam frigate *San Jacinto*, Capt. Wilkes, was returning home from the coast of Africa, where she had been for several months past engaged in suppressing the slave trade. The frigate stopped at Cienfuegos and there learned of the escape of Messrs. Mason and Slidell. Proceeding thence to Havana, it was understood they had taken passage on the 7th inst. on the British mail steamship *Trent*, plying between Vera Cruz, by way of Havana, and St. Thomas and Southamptom. While the *San Jacinto* was in the narrowest part of the Bahama Channel, about twenty-four miles to the westward, she met the packet, and, as usual in such cases, fired a shot across her bows and brought her to. Two boats were sent to her, under the command of Lieut. Fairfax, who, boarding the packet, arrested Mason and Slidell, who were personally known to him. They at first objected to being removed without the employment of force for that purpose. However, they were soon after removed without further trouble, and conveyed to the *San Jacinto*. Their respective secretaries, Eustis and McFarland, were also brought on board. The prisoners were sent to Fort Warren, in Boston harbor, where they are now confined. Capt. Wilkes made the arrest wholly upon his own responsibility, he having received no instructions to act from the Federal government.

Many apprehend that the action of Capt. Wilkes will lead to a war with England, but we cannot think so. We believe our government will act right in the premises, and if a wrong has been done to a friendly power, all proper reparation will be made.

GRAND REVIEW.

On the 20th inst., General McClellan, the Commander-in-Chief reviewed a division of the grand army of the Potomac of 50,000 men, near Ball's Cross Roads. It was the most extensive review, and by far the most imposing spectacle, ever witnessed in this country.

This system of reviewing troops is somewhat novel in our army operations, and many who are not familiar with its objects regard such demonstrations as unmeaning. Gen. McClellan's experience in the Crimea in 1855 fully convinced him of the importance of such reviews. Frederick the Great, Napoleon, Wellington and all great military commanders were in the habit of holding frequent grand reviews, and the system is kept up in all European nations. It is very inspiring, not only to the troops, but also to the officers.

MISSISSIPPI RIVER FLEET—NEW GUN BOATS.

An expedition down the Mississippi is rapidly in progress and will move upon the completion of the iron-plated gunboats in course of construction at Carondelet, Mo., and other places. The President has appointed Captain A. H. Foote flag officer of the fleet. A powerful gunboat, named the *Thomas H. Benton*, is now about ready and will be the flag ship of the Mississippi fleet. For eight weeks about two hundred men have been at work upon her, and their labors are nearly completed. The twin hulls of the *Benton* have been connected so as to form one powerful hull of 186 feet in length and 74 feet in breadth. The hull is very stanch, and is sealed up inside with three and four inch plank. It is divided into forty water-tight compartments; thus the *Benton* may be considered one of the safest war vessels it is possible to build, for it would scarcely be possible to penetrate every compartment during the closest and heaviest firing into her for hours. And then her hull, all over to below the water line, as well as every other exposed part of the boat, is covered with heavy iron. That about the middle of the hull is two and a half inches in thickness, and securely fastened by one and a half inch iron bolts, which are riveted inside, the heads of the bolts being countersunk, so that they cannot be knocked off by shot. The wheels are pefectly protected from shot and shell, the wheel house being covered with six-inch timber, and plated with boiler iron. The gun deck is spacious and a model of neatness combined with strength. It is seven feet four inches in hight, with a gentle inclination, calculated mathematically, as the safest shape for the purpose. The *Benton* is casemated all round, the timber being in parts twenty-four inches thick, and in less exposed places twelve inches, and all covered with two and a half inch iron. The casemates are built at an angle of forty-five degrees, in the most approved method for throwing off an assailant's missiles. The casemates are pierced for eighteen guns of the heaviest caliber, forward. She will have fore and aft two Parrott rifled cannon, which carry four or five miles On board this floating battery will be a full complement of all the necessary ordnance stores, and everything that can add to the comfort of the crew, as well as to the confusion of the enemy. It is probable this gunboat will be furnished with "telescope" chimneys, which are capable of being shortened, as occasion requires.

MISCELLANEOUS.

For the information of applicants to the government, too numerons to be answered individually, we are authorized to say that thus far no decision has been made in regard to permitting trade to Beaufort or its vicinity.

Mr. Savage, American Vice-Consul at Havana, had visited Key West on business, and on returning to his post on the 10th instant, reported that 1,500 Confederate troops had been discovered by the federal pickets some twenty miles from Fort Pickens on Santa Rosa Island. The picket guard immediatly conveyed information of the presence of the enemy to the commander of the federal fleet, who sent a force and shelled the rebels off the island with great loss. It is supposed the object of the enemy was to concentrate a force of 5,000 or more troops, and by a forced march to make another night attack upon Col. Wilson's camp.

The affair at Guyandotte, Va., noticed in our last number, appears not to have been so serious a matter as at first reported, but few Union troops were killed, and but few buildings were burned in retaliation.

The newspaper sensationists report that Gen. Johnston, commanding the Confederates, is marching at the head of 40,000 troops, threatening Louisville, Cincinnati or Lexington, and that Gen. Buell is concentrating his command at Danville to oppose the enemy's march.

Gen. Price is going into winter quarters at Fort Smith, Arkansas, and Gen. Hunter's troops have evacuated Springfield, Mo., and have returned to points on the railroad to await the orders of Gen. Halleck, who is now in command of the Western Department.

Rosecrans's forces have chased Floyd twenty-five miles from Gauley river, and at last accounts he was near Wytheville, Va. He evidently finds it uphill business to subjugate Western Virginia.

A speck of war looms up near Newport News, Va. The Confederate General Magruder, it is reported, is coming down by land and sea to attack the Union forces. Preparations are being made to give him a warm welcome.

It does us good to take up the Louisville *Journal* and the Louisville *Democrat*. These loyal papers are doing battle for the Union and the Constitution in the right spirit, and free from all fanaticism. We wish them abundant success in their good work.

The burning of several railroad bridges in East Tennessee by the Union men has caused great commotion among the Confederates.

Major-General Dix, commanding at Baltimore, has sent a force of 4,000 troops into Accomack County, Va., to protect the Union men there. This county is the residence of that distinguished belligerent, ex-Governor Wise, and is on the east side of Chesapeake Bay. There were some 1,500 secession troops in that region, who retreated in expectation of seeing Gen. Dix's troops. The General's proclamation to the people is a sensible document.

The Cabinet having had under consideration the propriety of granting passes to those who may wish to go through our lines and into the South for the purpose of preserving their property from confiscation, have determined to refuse such permission. There are many reasons why such permission on the part of the government would be manifesty improper, one of the chief of which is that no one can succeed in saving his property without declaring himseif an enemy of the goverment. The government has enemies enough now to contend with without allowing passes to more.

William L. Yancey, the great Southern fireeater, who is now acting in the capacity of a commissioner of the Southern Confederacy in Europe, is getting discouraged in his efforts to obtain a speedy recognition. On the person of James Brown, who was arrested in Boston on the 13th inst., a letter was found from Yancey to his son, in which he speaks discouragingly of his prospects.

Mr. Russell, in one of his recent letters to the London *Times*, says:—

> One of the main agencies on which the chiefs of the army rely for the establishment of discipline is total abstinence. Never has Bacchus in all his forms and poor John Barleycorn been so prosecuted in any army in the world. The sword has done what the pen never dared, and to all intents and purposes the sale of drink to a soldier is a crime, and drink of any kind is a *malum et prohibitum et per se*. One grim colonel rebukes his captain and threatens him with arrest for "drinking and fiddling in his tent," and intimates it was disrespectful to his commanding officer, possibly on the grounds put by the Indiana colonel for a similar offense. "You are to consider yourself under arrest, sir, for making a row in your quarters and not asking me to it." Another has a judicial decision on the question whether lager beer is or is not an intoxicating drink, and it is decided in the negative to the joy of Deutschland, who soon proves the contrary, and the lager is put in the *index expurgatorius* also.

Orders from Washington have been received in this city for the preparation of lumber for the construction of buildings for a naval depot at Port Royal for the manufacture of all kinds of machinery for naval and other purpose; also to dispatch at once storeships, which are to be permanently stationed at the point. The government intends, in fact, to establish there a permanent depot for naval and military purposes.

An ingenious soldier of the Fifteenth Ohio regiment, now on duty in Kentucky, has devised a method of warming tents, which is an improvement upon the similar contrivance of a Rhode Island soldier in Virginia, noticed sometime ago, and is described as follows: "In the centre of the tent a hole is dug in the ground about two feet square and two feet deep. From the bottom of this hole a small trench leads to the surface of the ground outside the the tent, to admit the cold air. From the top another covered trench leads to the opposite side of the tent to conduct the smoke out. The hole is arched over, very

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much like the top of a circular cistern wall, and an open space of perhaps a foot in diameter is left at the top for putting in the fuel. Cover this up (with an old stove plate, a bit of sheet iron, smoth stone or the like) and you have the floor of your tent converted into the top of a furnace. No room is taken up by heating apparatus; the heat is greatest where it should be, next the feet; the tent is pefectly free from smoke, and with any sort of fuel that is not absolutely soaked in water, you can raise the temperature just as high as may be desired.

"The Hoosier Railroad Regiment" is the title of a military organization in Indiana, now preparing for the war. It numbers one thousand men, all of whom are accustomed to working upon railroads. Indiana will be the first State to have in the field a regiment composed entirely of men who understand how to lay a track, repair a bridge or set up a locomotive.

The Cotton Question in Europe

Is beginning to assume more definite shape, and there now seems to be less disposition in the British press to countenance any attempt to break the blockade. The *Times* says :—

As the clouds thicken in the West, daylight dawns in the East. That we can open markets in the East whenever the markets of the West may fail we have already shown; but it now seems equally clear that we can find also in the East a substitute for the productions for which we have been accustomed to look almost exclusively to the West. India, which, properly stimulated, can produce all things, is bestirring herself to supply our necessities in the article of cotton. What has been long certain in theory is now about to be shown in practice—that with American seed and European supervision, we may obtain any quantity of cotton from India that Manchester will pay for.

India is becoming active, laborious and prosperous. She is beginning to call for European products, and the English merchant is carrying to India his manufactured cotton goods in payment for the raw cotton which India is just learning to produce. America is a great element, but not a necessity to our commercial well being.

The Liverpool *Mercury* bears similar testimony :—

The accounts from India are more encouraging than those from America. The Indian public seem to be at length thoroughly roused to the importance of the present crisis on the fortunes of India as a cotton-producing country. A very great step has been made by the introduction of steamboats on the upper part of the river Godavery. That great river, with its numerous tributary streams flows through the most extensive of all the cotton fields of India—namely, that of Nagpoor and Hyderbad. The quantity of cotton grown in this district is immense, and very little of it has ever found its way down the seacoast owing to the difficulty and cost of transport. Moreover, the quality is superior to that of the Surat cotton, and most equal to medium qualities of American. Mr. Mercer, one of the American planters who was employed by the East India Company to introduce the growth of the New Orleans cotton seed in India, speaking of this cotton says: "All the cotton I have seen from that neighborhood is of very good quality indeed, and better cleaned than is usual in Indian cottons."

Great arrays of statistics from India are given in the London papers to prove that the people of India are going into the cotton business extensively. A Calcutta letter in the *Times*, under date of September 23, says :—

The native mind seems to have been thoroughly roused on the cotton question. Accounts from all parts of the country, butmore especially from the rich cotton districts on the banks of the Godavery, speak of the area of land cultivated with cotton as far exceeding the proportion of any previous year. Bombay and Madras have taken the lead in this race, but neither Central India nor the Northwest have been slack in their preparations. If these have not been so forward as might have been expected, the cause lies in the uncertainty which has hitherto prevailed regarding the duration of the civil war in America. If that were to be an affair of only a few months, and if at the expiration of that time the Southern States were to return to their normal condition of cotton suppliers to England, the only result of the enterprise of the native capitalist would be terrible losses, and possibly ruin.

The Calcutta *Englishman* says :—

Our reports from all parts of the country continue to predict favorably of the expected cotton crop of this year: indeed we gather from all sides that an area considerably in excess of previous efforts are being made in the cotton-growing districts of the Madras and Bombay Presidencies particularly, to enable them to meet any call that may be made upon them for their staple. Tinnevelly has, perhaps, done more in this respect than any other district with the exception of Dharwar. The cotton growing districts bordering on the Godavery river, are also reported to have considerably increased the area usually devoted to the cultivation, and the facilities offered by the river for transporting it to the coast will render any increase from this quarter highly desirable, not only as offering a prospect of larger returns for money invested from the cheapness of water carriage to the coast, but from the early date at which it will be available for the same reason. In Tinnevelly great and successful efforts have been made not only to improve the staple derived from indigenous seed (to which much attention has been paid in recent years), but to introduce foreign varieties.

These extracts are full of meaning and fully confirm the position taken by the SCIENTIFIC AMERICAN at the commencement of the war; namely, that secession if persisted in would tend to destroy the cherished interests of the Southern States. The South has had no such enemies as Davis, Toombs, Yancey, Rhett and others of the same sort.

Intermeddling of the French Government.

It is well known that the French government is paternal in its character, regarding itself as a wise father and all its subjects as children. A Frenchman lives according to the prescriptions of his government. It stands by him in his bargans to see that he is not cheated, and it exercises a tender care over the orthodoxy of his faith. The French people have become accustomed to this watchfulness and they generally like it. We are pleased to see, however, that the most intelligent portion of the people are begining to discover that there are two sides to this question of the constant intermeddling of government with the private affairs of the people.

M. Pouillet has recently reported to the Academy of Sciences the result of the labors of a commission, in investigating a question in relation to alcoholometers, which was submited to the Academy by the administration, the commission declare that, if it is not impossible to bring alcoholometers under the dominion of the law of 1847, and by stamping them, afford a guarantee of their exactness, yet this measure, difficult to put in practice, would, in their unanimous opinion, be productive of more inconveniences, and very grave ones, than advantages, especially because the government stamp could easily become the sanction or covering of fraud. In the *Cosmos* the editors say that these unexpected conclusions were not combated by any member of the Academy, which adopted them by an almost unanimons vote.

A NEW WEAPON.—In speaking of this invention the Lynn Mass. *Bay State* says :—"A late number of the SCIENTIFIC AMERICAN contains an article on a weapon said to be invented by a German by the name of Thompson. The article referred to is a complete description of one invented many years since by Mr. Francis Dixon, of this city. We have seen the correspondence, or letter of acknowledgment, from the Ordnance Department, dated Sept. 24, 1846, Mr. D. having at that date offered the Battery, as he termed it, gratuitously to the government. Mr. Dixon, a few weeks since, renewed the offer of this battery, with some other more recent inventions, to the government, on the same terms; and fearing they would not, during the pressent pressure of business, be properly understood, has recently visited Washington for the purpose of giving a more full explanation of the whole."

EFFORTS FOR COTTON.—Immense exertions are made in England to extend the area of cotton cultivation. Ships laden with cotton machinery have been despached to Western Africa and Canadian colored people are sought to be removed thither as cultivators. A Consulship has been established by the authorities of Great Britain at Abeokuta, and T. C. Taylor, Esq., has been commissioned to the position. The celebrated traveler, Captain Richard F. Barton, has been appointed British Consul at Fernando Po. The isle and port of Lagos have been acquired by the British government. These movements may prove Africa's opportunity, while they exhibit strong evidence of the sagacity and energy of our trans-Atlantic neighbors to develope and profit by the commerce which the Western and central portions of the continent are destined to pourinto the lap of civilization. The United States pursues a policy which is repelling and discouraging to Africa.

THE WORLD'S FAIR.—In answer to repeated inquiries concerning the proper person to address in reference to articles to be exhibited at the approaching World's Fair, in London, we would state that applicants in New York and vicinity can make their entries at No. 61 Canal street, with Joseph E. Holmes, where the necessary papers will be found, and the Commissioners will cause all articles to be examined that may be entered.

THE Chinese were the first who constructed cannon with iron bands shrunk upon them for the purpose of strengthening them at the breech. The Chinese built vessels with water-tight bulkheads, hundreds of years ago. This has been considered by most persons quite a modern invention.

What Our Good Neighbors Say.

The Brooklyn (N. Y.) *Star* said to its readers, not long ago, asfollows :—

We notice with pleasure the increasing success of the SCIENTIFIC AMERICAN, published by Munn & Co., New York. The intrinsic merit of the publication deserves the prosperity it enjoys, and its career is a striking proof of what may be effected by enterprise and untiring industry. The SCIENTIFIC AMERICAN commenced as a very small sheet, and with little or no adventitious aid. From the first issue it has steadily advanced in circulation and influence, and now stands in the first class of scientific journals in the new and the old world. It is invaluable to the scientific man, and interesting to the general reader.

The New York *Sun*, a newspaper of immense local circulation, with a desire apparently to out-do the *Star* in its complimentary notice of the SCIENTIFIC AMERICAN, publishes the following :—

The SCIENTIFIC AMERICAN has a pleasing faculty of presenting agreeable information with the scientific, and no paper excels it in its general melange of useful knowledge, thus rendering it alike suitable to the inventor, to his family, to the farmer and his family, and to other classes, also. Representing as it does the inventors' interests in this country, a class growing more and more powerful and efficient every year, and acknowledged as a journal of the highest authority, in this or foreign countries, on scientific subjects, we are confident in seeing it grow with the growth and strengthen with the strength of these interests in times to come, the same as in times gone by. It is one of the best newspapers in this country. It is now, as it has always been, the fit representative of the patent interests in this country, in which business it has always stood forth the largest and most effective establishment in the United States.

The *Radii*, published at Canajoharie, N. Y., and edited by a deaf mute, but one of the mostintelligent gentlemen we ever met, is responsible for the following :—

We welcome among our exchanges this most excellent periodical, and our numberless scissorings from it show better than any words the justly high admiration in which it is everywhere held.

Its pages are meat and drink to any intelligent mind—for it does not contain mere dry descriptions of mechanical devices, but puts the thing before your eyes in engravings of the highest art, and fills its pages with an epitome of all the most interesting artistic, inventive, philosophical and scientific knowledge of the day.

In urging our many readers to avail themselves of its tuitions, we are not going through the too common platitudes of "puffing," but express our honest conviction that money invested in subscribing for it, will be returned in information and pleasure more than a hundred fold.

The new volume begins with the New Year, and we know no better way for any man—business man or mechanic—to treat himself, than to send $2 to Munn & Co., of New York, for this journal.

The Gratitude of Inventors.

The two annexed letters from persons for whom we have recently secured patents, speak for themselves. In the list of claims published on another page (the issue for a single week) we recognize the names of TWENTY patentees whose business was transacted through this office, every one of whom, we trust, are as well satisfied with the manner in which their applications were prosecuted before the Patent Office as the gentlemen who have given the following expression to their feelings :—

MESSRS. MUNN & Co. :—I have this day received from the Patent Office the letters Patent on my invention for Attachable Mosquito Bars to Bedsteads, obtained through your Agency. I wish to thank you for the expedition used by you in procuring said Letters Patent. Should I at any future time require a repetition of such services, I shall again confide my cases to you. Very respectfully,

Yours, S. ROEBUCK.

Brooklyn, Nov. 13, 1861.

MESSRS. MUNN & Co. :—*Gentlemen*—The English patent has been received, and in duty to you I state that you have honorably guarded the trust reposed in you, and as well prosecuted my case with promptness and efficiency. With pleasure I recommend you to every inventor that wishes to employ reliable men. Please accept the thanks of your friend and patron. Respectfully,

JOHN T. SCHOLL, M. D.

Port Washington, Wis., Nov. 1. 1861.

KNITTING.—The following directions for knitting are furnished to the Boston *Post*, who always "carries her Knitting work :"—"Cast twenty-six stitches on each needle. Rib two inches two and two. Commence the thumb by taking two stitches as seam stitches, and widening two stitches between these two seam stitches. Knit three rounds between each widening until you have twenty; take these twenty off for the thumb, make twelve stitches, then decrease every other till only three of the increased stitches remain. Knit a little more than an inch plain. Now for the finger; take off twenty stitches, make, twelve, and knit the same as at the thumb; knit about an inch and a half plain, then narrow every sixth stitch; knit six rounds, then every fifth, and five rounds, and so on. Then take up the finger, narrow to twenty-nine stitches, make the finger a little shorter than the mitten; now the thumb, reducing the stitches to thirty."

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THE GEOLOGICAL HISTORY OF NORTH AMERICA.

BY DR. STEVENS.

Third Lecture.

This map represents the form of the North American continent at the commencement of the geologic record, as nearly as we can make it out after all the devastation that has taken place. Then Labrador formed the only portion of the continent above the sea, with the exception of the Adirondack Mountains, the peaks of the Alleghanies, and these others that I have already described as forming a number of iron and granite islands in the midst of the lifeless seas.

This evening I purpose to describe the first rocks that were formed upon granite and the azoic slates—the oldest rocks that contain any remains of animal or vegetable life. These were coral reefs, formed in the shallow waters off the southeast, the south and the southwest shores of what was then the continent. This reef extended from the British possessions in the northeast, sweeping round entirely across the State of New York, away here through Wisconsin, and since this map was made it has been traced beyond Lake Winnipeg at the northwest. It now exists as limestone rock, which on being examined is found to be one mass of coral. Other coral reefs surrounded the islands.

The coral reefs, you are aware, are formed by one of the very lowest orders of animals. Cuvier discovered that all of the animals on the earth are naturally divided into four great orders. The highest are those having vertebra or backbones, and are called vertebrated animals. The next order in the descending scale is composed of those animals which grow to an outside crust, like the lobster, called crustacea. Clams and other similar soft animals form the order of molusca. The last and lowest are the starfishes, mere masses of jelly or muscle without any true bones, generally radiating from a common center, and therefore called the radiata. The coral animals belong to the order of the radiata.

But we find in the rocks of this period remains of animals belonging to the next two orders, the molusca and the crustacea. I will draw upon the blackboard a figure of one of the fossils that are found in great numbers in the rocks of this period, and you will see that it belongs to the order of the crustacea. It resembles somewhat the horsefoot, or king crab, of our waters. Its name is paradoxides, a trilobite. This is another fossil found in these old rocks, which you see is a molusc, being but a slight variation from a soft clam. It is a singula. The other queer form, radiating from a center, is a bryozoo, belonging to the radiata.

These low forms of life were all the inhabitants that the world then had. As we proceed in our history, you will discover that it was a very long time before the lowest class of vertebrated animals, the fishes, even the lowest forms of fishes, made their appearance in the ocean. Seaweeds were the highest forms of vegetation.

In this moluscan age were deposited many thousand feet of sandstones, limestones and shales, filling up the bottom of the seas in those regions now known as Western New York, West Canada, Middle Ohio, Northern Illinois, Wisconsin, Minnesota, Northern Iowa, the Red river country of the north, Central Missouri, Kentucky and Tennessee.

The soils from these rocks form the richest wheat and clover lands of our country. They are inexhaustible in their fertility. Many of the rocks contain as high as 14 per cent of organic matter still preserved in these cemeteries of an ancient world.

The minerals properly belonging to this age are, the native copper of Lake Superior; the copper ores of Acton, Canada East; the lead of Iowa, Wisconsin, Illinois and Missouri; the gold of Du Loupe and Chaudiere, in Canada, of Franklin, in Nova Scotia—recently discovered—and some of the gold mines of North Carolina.

The iron ore pecular to this age is dyestone ore of Tennessee, the lenticular ore of Pennsylvania, the oolitic of New York and the red ore of Dodge county, Wisconsin; all being one and the same ore, known by different names in widely separated localities.

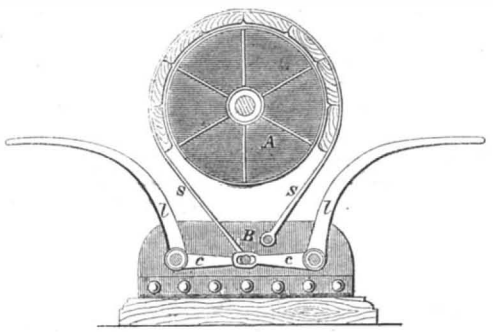
You perceive that the minerals are quite different from the last age. Each age or era of geological history has its appropriate minerals, as it has its fossils, peculiar to, and diagnostic of it.

In my next lecture I shall exhibit another map of the United States, exhibiting its outlines in the fish era and great plant-bearing age.

MERITON'S SAFETY BRAKE FOR STEERING GEAR.

We take the following from the *Mechanics' Magazine:*—The alarming accidents which so frequently occur from heavy seas striking the rudders of ships, when, from the sudden impulse given, the helmsman is ofttimes carried over the wheel, the result being serious if not fatal injury, have led Mr. Meriton to devise a simple and economical means of preventing such accidents, the value of which is enhanced from the fact that it is applicable, at small cost, to new steering apparatus, as well as to all that are already in use, and without in any way interfering with or affecting their proper action.

Mr. Meriton's invention consists in the application of a brake to the various descriptions of steering apparatus, and in the construction of the brake itself, which is so constructed as to admit of its being worked from both sides of the barrel or steering apparatus by means of levers, so that when a heavy sea strikes the rudder, the helmsman can apply the brake—or if two be steering, both can do so—and thereby secure firm footing and perfect security from accident.



The construction and application of the brake will be readily understood by a glance at the above engraving, by which it will be seen that the brake consists of a drum, A, round which passes a strap or band, S S, having upon its under surface, where it comes into contact with the drum, stops of wood, or other suitable substance, for the purpose of causing great friction, and thereby effect the braking of the barrel which contains the chain working the rudder.

The necessary motion is imparted to the strap and drum, by a mechanical arrangement of cranks and levers, *c l*, one end of the strap being fixed to a pin or stud, and the other attached to the cranks or levers, so that upon lifting the levers the requisite amount of friction is produced. The levers act simultaneously.

Lessons from the Leaves.

We men sometimes, in what we presume to be humility, compare ourselves with leaves; but we have as yet no right to do so. The leaves may well scorn the comparison. We who live for ourselves, and neither know how to use nor keep the work of past time, may humbly learn as from the ant foresight, from the leaf reverence. The power of every great people, as of every living tree, depends on its not effacing, but confirming and concluding the labors of its ancestors. Looking back to the history of nations, we may date the beginning of their decline from the moment when they cease to be reverent in heart and accumulative in hand and brain; from the moment when the redundant fruit of age hid in them the hollowness of heart whence the simplicities of custom and sinews of tradition had withered away. Had men guarded the righteous laws and protected the precious works of their fathers with half the industry we have given to change and ravage, they would not now have been seeking vainly in millennial visions and mechanical servitudes the accomplishment of the promise made to them so long ago: "As the days of a tree are the days of my people, and mine elect so long enjoy the works of their hands; we shall not labor in vain nor bring forth for trouble, for they are the seed of the blessed of the Lord, and their offspring with them."

This lesson we have to take from the leaf's life; one more we may receive from its death. If ever in autumn a pensiveness falls upon us as the leaves drift by in their fading, may we not wisely look up to their mighty monuments? Behold how fair, how far prolonged in arch and aisle, the avenues of the valleys, the fringes of the hills! So stately, so eternal! the joy of man, the comfort of all living creatures, the glory of the earth, they are but monuments of those poor leaves that flit faintly past us to die. Let them not pass without our understanding their last counsel and example; that we also, careless of monument by the grave may build it in the world-monument by which men may be taught to remember, not where we died, but where we lived.—*Ruskin's Modern Painters.*

The Lemon Trade.

The most delicate varieties of lemons known in the export trade are the Poncine, incomparable, the Naples, the sweet lemon, the imperial, the Gaeta, the large fruit and the wax lemon. The most delicious, however, are the hothouse production, which are known only in the conservatories of the wealthy. The peculiar nature of the lemon tree, on which may be seen at the same time the blossom and the fruit in all stages of growth, continues the supply through every month of the year, but in greatest abundance in the spring. The importations, which continue during the year, are largest from January to June, in which month they seem to culminate. The scarcity of the supply at present is variously accounted for, but may be safely attributed to the general interruption to commence occasioned by the rebellion of the Southern States. The supply in the market is not always governed by the demand, as there are but four houses in New York who import on their own account, all other shipments being made on account and at the risk of the producers. It will thus be seen that the trade is of a precarious character, and not likely to tempt investment. The number of boxes brought to this country from Sept., 1860, to Aug., 1861, according to the most reliable figures, is, to New York, one hundred and twenty-five thousand; to Boston, thirty-five thousand; to Philadelphia, thirty-one thousand; and to Baltimore, where the season closed earlier than usual, only eight thousand. This is less by fifty thousand boxes than the importations of the previous year. No natural production varies in price so much as do lemons, oranges and Mediterranean fruits. Ten days ago lemons were worth twelve dollars a box, and this week they are six. Last year the price ranged from fifty cents to seven dollars a box. The price is governed by the immediate supply, as they are purchased for immediate consumption.

The Oldest Record.

The oldest of all records of which we have any knowledge was written upon a swift-flying ray of light. Sir William Herschel estimated that some of the nebulæ which were faintly visible by means of his forty-foot reflector were so remote that light occupied two millions of years in coming from them to us. Consequently we see the nebulæ, not as they are now, but as they were two millions of years ago. Looking in the telescope, we are reading the very oldest of histories. Since the nebula had the form which it presents to us—since the ray of light started forth to convey the intelligence of this form, races of men have advanced from barbarism to civilization and have written voluminous histories, which have moldered into dust; and yet the light bears its shining record across the ages, as bright as when it was first so curiously written upon the flying ray.

PHOTOGRAPHS OF GHOSTS.—The *London Review*, in an article on the tendency in modern literature to the revival of ghost stories, suggests to the writers as a verification, that they obtain photographs of their spectral visitors. It says:—"Now, if the specter can ask the favor, let science do it a good turn. Let optics and chemisty catch this modern ghost and photograph it! It can fix the tails of comets and the atmosphere of the sun; the other day a photographer at Berlin caught a stream of electric light flowing out of the bronze spear of Kiss's "Amazon." A ghost can hardly be less material, if it wear crinoline, is helped twice to beef, drinks claret and wants a portrait taken. The photographer's plate is liable to no delusions, has no brains to be diseased, and is exact in its testimony.

A PATENT has been secured by J. Walker and J. Barnes, England, for enameling common card cloth to render it impervious to grease and oil.

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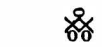
CHEMISTRY OF IRON.

Number V.

IRON AND OXYGEN.

Iron has a very strong affinity for oxygen, so strong that if perfectly pure iron in powder is exposed to the air it combines with the oxygen of the atmosphere so rapidly as to become red hot; in other words, it burns spontaneously. Iron combines with oxygen in four different proportions, but there are only two of these which are of any interest, and which it is desirable to understand. These are the protoxide and the sesquioxide, the simplest being the protoxide, which is formed by the combination of one atom of iron with one atom of oxygen, Fe O. Whenever any element combines with oxygen in several different proportions, the one containing the least oxygen, if not an acid, is called the protoxide. This word is from the Greek *protos*, first, and is intended to signify the first step in oxydation. The protoxide of iron has so strong an affinity for oxygen, that if exposed to the air it immediately combines with more oxygen to form the sesquioxide. The Latin word *sesqui* means one and a half, and it is used in chemical nomenclature to express a combination between two substances in the *proportion* of one atom of one substance to one and a half atoms of the other. This is the *proportion*, but as there is no such thing as half an atom, the real combination is of two atoms of one substance with three of the other. The atom of the sesquioxide of iron is composed of two atoms of iron combined with three atoms of oxygen, $Fe_2 O_3$. It would be represented in our engravings thus :—



This combination is also called the peroxide of iron. *Per* is a Latin prefix signifying through, or to the end, and in chemical nomenclature peroxide implies that the substance has received all of the oxygen that it will take; that it is as highly oxidized as it can be. If, however, oxygen. in combining with an element, forms an acid, the substance is named an acid instead of an oxide. One of the proportions in which oxygen combines with iron is that of one atom of iron to three atoms of oxygen, $Fe O_3$; and as this combination produces a substance with acid properties it is called ferric acid, from the Latin name of iron, *ferrum*.

Sesquioxide of iron is the most abundant of the iron ores. Red hematite is the sesquioxide; and brown hematite is a hydrated sesquioxide; that is to say it has water chemically combined with it. The atom of brown hematite is formed by combining two atoms of sesquioxide of iron with three atoms of water. The formula is, therefore, $2 Fe_2 O_3 + 3 HO$. It will be remembered that HO in chemical formulæ means one atom of water; the atom of water being composed of one atom of hydrogen and one of oxygen. As the oxygen atom weighs eight times more than the atom of hydrogen, there are eight pounds of oxygen and one pound of hydrogen in nine pounds of water.

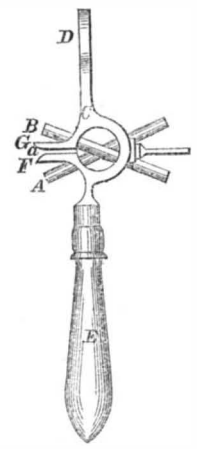
Common red-iron rust is the sesquioxide of iron. The brown freestones, so much used in the buildings of New York, the red sandstones of New Jersey, and all rocks of a reddish-brown color owe their hue to the sesquioxide of iron which they contain.

The only combinations of iron that are of any particular interest are the protoxide, Fe O, the sesquioxide, $Fe_2 O_3$, and a certain combination of these two, of which we shall give a full description in our next article.

THE NEW METALS RUBIDIUM AND CÆSIUM.—M. Bunsen, in the *Annal der Physik und Chem*, states that the equivalent of rubidium is 85.36 (H = 1), which is more than double that of potassium. It is more electro-positive than potassium, and it decomposes cold water. Cæsium is named from cæsius (sky blue) on account of the ray which it produces in the spectrum. Its equivalent is 128.4, ranking by the side of that of iodine and gold, and is one of the very highest. This metal is less abundant than rubidium, but it is generally found along with it; the richest source of it yet known is the mineral waters of Durkheim. Bunsen states that probably all the saline mineral waters contain rubidium, in the condition of a chloride. No useful application has yet been made of these metals.

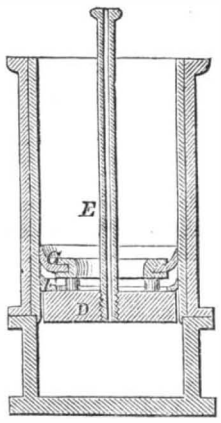
NOVEL KNIFE SHARPENER.

The old fashioned "steel" consisting of a long, tapering cone of steel roughened on the surface, seems to have had its days as a knife sharpener, judging from the innovations made upon its use, lately, by what are called "angular knife sharpeners" composed of hard blades of steel between which the blade of the knife is inserted and drawn. The accompanying figure represents a new and more highly developed knife sharpener. It has two rounded file bars, A B, confined in the holder, C, in which they are clamped. F G are guide bars open at *a* for the reception of the knife, which is guided by them to be acted upon by the angulated file sharpeners. D is a rest for the instrument, and E is its handle. The knife sharpener can be held very firmly with one hand, on account of its having the rest; and with the other hand the knife can be applied properly to the files, A B. Patented March 6, 1860; patentees, S. C. and B. S. Stokes of Manchester, New Hampshire.



Black Washing Molds for Castings.

The interior of molds requires to be coated on the surface with blackwash of coal dust, to prevent the adherence of the sand. This is usually a very troublesome operation for the molds of pipes. The accompanying figure is an interior section of a convenient mode for effecting this object. D represents a piston having a hollow rod, E. The edges F, are provided with a piece of felt cloth, and G is a brush. The blackwash is supplied through the hollow piston rod, and the brush and piece of felt cloth distribute it very evenly upon the inner surface of the pipe mold, and the piston at same time smooths it. In the same manner iron pipes, designed to be laid underground may be coated inside with asphalt or other adhesive solution to prevent them from rusting. Patented, March 13, 1860; patentees, W. and D. Ferguson, New York.



A New Metallic Alloy.

We owe to the process of alloying or mixing metals some of the most serviceable metallic substances employed in the mechanic arts. The modern discoveries in this branch of chemistry, however, have scarcely kept pace with those in other departments of the science. Two, at least, of the more important alloys are of great antiquity. Brass, we are told in the Bible, was manufactured by the antedeluvians, and bronze of a quality that has never been surpassed was in general use among the ancient Greeks and Phœnicians. When the art of working iron became understood that mineral took the place of the old alloys, as also of the softer metals, as a material for a large proportion of the implements of peace and war, and with the application of steel to its present uses the triumphs of iron may be said to have culminated.

Strange to say, few successful attempts have been made to blend other metals with steel. It seems to have been taken for granted that the article could not be so alloyed as to extend or increase its utility. American ingenuity and skill, however, are likely to disabuse the world of this error, by introducing into the arts a composite with steel for its basis, which cannot fail to be regarded, in an economic point of view, as of great importance.

To Messrs. Brown & White, of this city, belongs the credit of having discovered this new alloy. It is composed of steel, zinc, tin and manganese, and bids fair to work a revolution in some kinds of manufactures. The proportions of the ingredients we are not at liberty to state, as a patent has not yet been secured. The density of the alloy is greater than the mean density of its constituents; it presents a beautiful white and lustrous appearance, and is adapted, we are assured, to the manufacture of many articles in universal demand, such as axes, cutlery, &c. At present the discoverers are employing it extensively in the manufacture of bells for churches, factories, ferries, fire towers, &c., which are claimed to be equal to any made of the ordinary bell metal, while the price is two-thirds less.

Rigid economy in expenditures is a necessity with many churches, and of course no church, rich or poor, would desire to pay 30 cents a pound for a bell when it could obtain an equally good one at a little more than one-third that rate. If the only result of the discovery was to place a good bell within the reach of every church, however moderate its means, it would merit a favorable notice at our hands; but we are informed that the new alloy has a wider application, and we shall watch with interest the effect of its introduction in other branches of the arts.

Bells cast from the new alloy were exhibited at the late State fair, held at Watertown, N. Y., and the committee, after testing their qualities, awarded the exhibitors a premium.

What Becomes of the Silver?

Europe and America have been drained of silver to supply the demand of the British East India Company, who, since 1830, have required their revenues to be paid in silver. In this country, the intrinsic worth of silver has been reduced about 7 per cent in order to keep it here. The drain from Europe still continues. The gold that is brought into England is sent to the Continent, exchanged for silver, which finds its way to India, and there disappears. During the last twenty-five years, the shipments of silver to India have reached the enormous sum of $550,000,000, of which $92,000,000 have been re-exported, leaving $450,000,000 unaccounted for. And these shipments have lately been on the increase. For the first five years of the term named, the shipments were $45,000,000, showing an average of only $9,000,000 per annum, while for the last five, the shipments have been $215,000,000, or $43,000,000 annually, and the current is not yet checked. The movements of specie in all other lands can be distinctly traced, but here the keenest sagacity is at fault.

With the shipments to India there has ever been an insoluble mystery. It is like a stream emptying into a bottomless gulf, with a returnless flow. Some have conjectured that the silver thus sent to India is used up for ornaments; but this would account for only a small portion of the immense total. We should not be surprised if the secret of this flow of treasure in one direction was found altogether in the methods taken for its preservation in that distracted country, by burying it in the ground.

Cochineal in India.

An Indian correspondent of the London *Globe*, has recently pointed out that the cochineal insect—the dye of which is at present, with the exception of a small quantity imported from Madeira, entirely derived from South America—is found over a vast tract of country in British India. It was introduced in 1801, when the lac insect was unknown, and cochineal was worth $7 a pound, by a gentleman of the name of Dawson, tempted by a prize offered by the East India Company. The cactus, on which alone the insect flourishes, grows profusely throughout the south-western provinces of the Indian peninsula. Within a very short time, the cochineal extended over 800 miles of country; but, as no persons who understood how to prepare the article for market had been introduced with the cochineal insect, the commercial speculation completely failed. In the course of time, the cochineal insect extended from Fort St. George, where it was landed, 4,000 miles inland. Here it is now found in a wild state, but the natives have not yet learned how to use it for coloring silk and wool.

H. EDWARDS, London, has applied for a patent for making horse shoes of combined iron and steel, in bars. The iron and steel are rolled together in a bar, so as to leave the steel on the wearing face when forged into shoes.

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Correspondence

The Rifle Question.

Messrs. Editors :—There is no question of the day in which I feel a greater interest than that of the rifle. I have been much pleased in reading the few articles which have appeared in the Scientific American from time to time on the subject, and hope to see them not only continued, but greatly enlarged, and more specific.

The rifle is preëminently the American arm. To the skill and efficiency of our forefathers in its use more than to any other means are we indebted for our success in the Revolution. Who that has not read of the marvelous skill of Marion's men—it being asserted that one of them, a mere lad of 14, could invariably snuff a candle at 100 yards off-hand. Such skill in the use of the rifle was not an exception, but the rule then. The skill of western and southern men in its use has long been proverbial. Target shooting is one of the pastimes of those regions, as I can testify from a long residence there ; and that together with its constant use in hunting, is what has given them their skill and proficiency in the use of the rifle. All that however has been done with the old-fashioned muzzle-loading rifles, of small bore and a range far inferior to the improved rifle of the present day. In the older portions of our country, where game has become scarce, rifle shooting has become sadly deficient, the only practice of that kind now prevailing being mostly confined to what are termed "sporting men," who shoot at a target with sporting rifles, often with telescope sights, and almost always at a rest. By these means they are enabled to make some very fine shooting ; but for practical purposes such shooting is of very little account. Not one time in ten does a man in hunting or in fighting get a chance to shoot at a rest, and hence it is that these fancy shots almost invariably fail in bagging as much game as the rough western hunter, when the two hunt together. To render rifle shooting practically useful a man must be ready to fire at a moment's warning, any where, and at any time. Of course, this necessitates his shooting off-hand, which is the only true way to shoot, for all practical purposes. You doubtless recollect the statement which went the rounds of the press some time since, about Queen Victoria hitting the bull's eye, and how amused we all were on being told afterwards that she did it by having the rifle screwed fast in a vise, then standing at a distance and pulling a string attached to the trigger ! Now, all shooting at rest, partakes more or less of that character. I cannot see in it any great exhibition of skill. Of course, if the range of the rifle is sufficient and the sighting accurate, and the gun held or laid solid on the rest, the ball will hit the mark—provided it is not varied by the wind from its course ; but what skill is there in that ? A child may pull the trigger in such a case, and prove itself as good a shot as the best of them. But to hold the rifle without any rest, —by the aid of the hands and shoulder alone—and plant the ball exactly where it is desired, is a very different affair. In that there is skill, a skill so applied as to produce a practical and beneficial result, which cannot be obtained in any other way, or by any other means. To do this is not as difficult as most persons imagine. All that is required is constant practice and care. The more a man shoots at a rest, the more unskillful does he become in off-hand shooting ; that is, unless he also keeps up the practice of the latter. To become a good rifle shot, a man should be constantly practicing. He should not only shoot at marks set up for the purpose, but he should take aim, and also fire at objects of various kinds all around him, and at different distances. To be a good marksman, he must also be a good judge of distances, so as to know whether to aim high or low, and also to take into account the force and direction of the wind and its effect upon the ball. Above all he must know his gun. He should have practiced with it so constantly as to know exactly how and where it carries, its range and peculiarities, if it has any. In short, the one great rule in rifle shooting more than in almost any other art, is that "practice makes perfect." It was this which gave to our fathers, and which now gives to our frontiersmen, their skill and proficiency in the use of the rifle. They seldom go from home without it. It accompanies them in their travels and in their rambles, whether for pleasure or business, through forest and field, over mountain and prairie. It is their constant companion, and on its operation they place implicit reliance. No man can use the rifle successfully, either in hunting or fighting, without that reliance on it, and that can only be acquired by practice. An experienced shot can almost always tell at the instant of firing, whether or not he has been successful ; at least there is nearly always an impression on the mind which is generally correct.

In the older settled portions of our country, this constant practice with the rifle has greatly fallen off, and the result is plainly visible among the regiments now here. In many of the regiments from the cities and towns of the eastern and middle States, there is a terrible deficiency in the use of the rifle. Many of the men probably never fired one a dozen times in their lives before ; and the consequence is that almost any western youth can beat nine out of ten of them in off-hand rifle practice. How can such men have confidence in themselves ? and if not, how can they be relied upon in battle ? As well might we send women to battle, as men who don't know how to use the arms placed in their hands—who, in all probability shut their eyes when they shoot, and are as likely to send their balls flying over the heads of the foes or into the ground not twenty rods off, as into the ranks of the enemy. These remarks are not intended as reflecting at all upon the men ; but only to show how important it is that we keep up our practice in all parts of the country. The men are naturally as competent and brave as any ; but they lack the practice necessary to make them efficient. When it is borne in mind that it is now an established fact that a given weight of projectiles fired by competent men from the improved long range rifles, is more destructive to an enemy than the same weight fired from artillery, a person will see at a glance, that rifle shooting is a very important art, even in a national sense. Why it is that there is not more target practice among our troops here I am at a loss to understand, unless it is that they expect or desire to see the war carried on, and "nobody hurt" on the rebel side. The cost of the ammunition used is the only excuse I have heard given ; but it strikes me that the lives of our soldiers, to say nothing of the success of our army, is of quite as much value as the ammunition that would be used in practicing.

It strikes me as a very important matter, that the practice of rifle shooting should be revived throughout the country, and especially so at the present time. I was much pleased with your remarks about a national rifle association. We ought to have not only a national, but county, town and neighborhood associations of the kind. Frequent trials should be had and prizes offered, to stimulate the people everywhere to participate. A system of prizes, similar to that adopted in the English army, might be adopted in ours with much usefulness.

What is the best rifle, is a question far more difficult to determine ; but of that I will, with your permission, speak hereafter. Rifleman.

Washington, Nov. 18, 1861.

A Cheap Prism and a Cheap Newspaper File.

Messrs. Editors :—I see in the last number of your paper an interesting account of the spectroscope, which set my wits to work to construct one for my own amusement ; not having the chandelier ornaments or any solid pieces of glass to construct the prisms of, I took a very clear thin pane of window glass, cut out two pieces to suit my taste, cut a tin back and bottom for the third side, fastened with tin strips and set the glass with putty, making a very pretty prism with open top in which to turn some clean water when I wished to use it. The prism would have to sit on its end, instead of lying longitudinally, which I suppose makes no difference in the reflection. I think it has some advantages over the solid prisms Defects in the material used do not show so plainly, the cost is slight even for a large one, and they might be constructed tight like a spirit level and used in any position. Most people have skill enough and material handy for the construction.

Please inform me through your paper if there is novelty or value enough in it to entitle it to any notice. It seems to me that the rays of light will be better admitted and refracted in pure distilled spirits than in glass.

I believe there are three or four copies of your publication taken in this community. I peruse it weekly, and consider it of more value and interest than any other paper we take. I have constructed a very cheap, handy file for holding a paper, and, though some may consider it heavy, it answers the purpose without injury to the paper. Take two strips of wood the length of the paper when folded, and a quarter of an inch thick, the other half an inch, both to be an inch wide. Gage them through the center and put in three inch and a quarter screws equidistant. In the thick piece, in the side that is to be the back, put two short screws, to screw in or out as it may be desired to increase or diminish the size of the file. This forms a pair of clamps, into which may be slipped a brown paper, or a leather cover, into which the papers are put and then the clamps are screwed together, either with a screw driver or with thumb screws.

H. G. Hollister.

Mount Lebanon, Mass., Nov. 7, 1861.

[If our correspondent will fill his prism with the bisulphide of carbon he will have the prism used by Bunsen and Kirchoff in their apparatus, which is illustrated on page 20 of our current volume. Water, however, makes a good prism.—Eds.

Electro-plating Cast Iron.

Messrs. Editors :—In your number of the 16th inst., you inform L. B. J. that "it is very difficult to cover cast iron with any metal by the electro-plating process." So it is ; but more difficult to cover hard steel, or even some kinds of soft steel. I have experimented for years, as an amateur, in this beautiful art, and have concluded that nothing but the combination numbers of the lottery men can represent the phases to be met and understood, in order to be quite successful in this pursuit. If you will permit, I will suggest to him (or you can) a process which has never failed me, and similar to one I have seen in print since I commenced it. It is very simple thus : chloride of silver (nitrate of silver dissolved in rain water and precipitated with pure muriatic acid and washed well), dissolved in a solution of cyanide of potassium ; the chloride—being kept in excess—should be used as a bath for plating. The iron, if practicable, should he heated slightly red hot, and cooled in water, then cleaned in dilute sulphuric acid in contact with a piece of zinc, washed thoroughly, and quickly introduced into the silvering bath. If the work does not admit of being heated, clean thoroughly with an alkali, wash, apply the dilute acid a longer time, brush and wash thoroughly, and immerse immediately into the silvering bath as above. Permit me to say that this silvering solution seems to me better for almost all purposes and all metals, than that made of the cyanide solution, for one reason, that nearly all the cyanide of potassium for sale, contains iron, which is not developed in the bath recommended, as in that made of cyanide of silver.

Another good reason for its use is that it is less expensive and troublesome, the nitrate of silver being converted into the chloride almost without cost, whilst if the cyanide is used, it must be at considerable expense of decomposed cyanide of potassium, as you will perceive at a glance. R. H. A.

Theory of Consumption.

At a late meeting of the Academy of Medicine, Paris, Dr. Piorry read a paper on the treatment of consumption, in which he laid down the following propositions. First, pulmonary phthisis is a combination of multifarious variable phenomena. Second, there does not and cannot exist a specific medicine against it. Third, neither iodine nor its tincture, neither chlorine nor sea salt, nor tar, are anti-phthisical remedies, as some have pretended. Fourth, while there are no specifics against this disease, there are systems of treatment to be followed in order to conquer the pathological states which constitute the disorder. Fifth, in order to cure consumptive patients, the peculiar affections under which they labor must be studied, known and counteracted by appropriate measures. Sixth, the tubercle in the lungs cannot be cured by the use of any known remedy, but good hygienic precautions may prevent its development.

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A Moss Basket.

MESSRS. EDITORS :—At your request I send you a statement regarding my patent Moss Baskets, what they are designed for, and the advantages they effect. I will, in a few words, describe them so that your readers may have an idea of them. After several years of continual experiment, I have at last succeeded in growing successfully and perfecting equal to any of the most approved methods practiced, all kinds of fruits and flowers both for use and ornament.

As you are aware, when I procured my patent for this valuable invention through your office, I exhibited, at the Patent Office for examination, a basket containing a black Hamburgh grape vine in full bearing, which was pronounced by competent judges equal, if not superior, to those grown in the house in the ordinary way; also a basket containing a peach tree in full fruit, of most excellent flavor, fine form and beautifully colored. These were all tested by connoisseurs, and pronounced by them superior to any ever offered for sale, or grown in the ordinary ways.

An engraving of the basket of grapes recently presented to Mrs. Lincoln, is herewith annexed, so that your readers may judge of its appearance. This method of growing either fruit or flowers is preferable to any other, for its beauty, simplicity, and success, as less care and attention are necessary than for ordinary plants, and they will last for years without renewing or shifting. All kinds of plants, fruits and flowers can be grown in this way, especially pineapples, oranges, figs, grapes, peaches, peas, &c., beside all such small fruits, as currants, gooseberries, strawberries, &c., to say nothing of more beautiful and attractive things, such as the camillas, roses, azaleas, fuchsias, orchids, ferns and variegated leaved plants, which, when once seen and appreciated, no one will be without their "hanging gardens." What so beautiful for the sick room as a basket of choice fruit or flowers that will not decay or fade, but continue to grow and bloom, and cheer the drooping invalid? Or for the parlor window or dinner table, what more elegant than these baskets all covered with the choicest specimens of fruit or the finest of blooms?

Thousands of persons have visited, during the past season, the residence of the Hon. W. B. Lawrence, at Newport, R. I., to see these wonders and novelties in gardening, and all were surprised and delighted with the beauty of these baskets. They have not been exhibited in public except at the last meeting of the Brooklyn Horticultural Society, when a basket containing a pineapple in full maturity was shown, and pronounced by several distinguished horticulturists superior to any they had ever seen grown either in England or the West Indies; also a basket of strawberries in full fruit, ripe, partly ripe, and in flower, now in the middle of November; also a grape vine, peach tree and two baskets of miscellaneous plants in full flower. All persons desirous to see these, or to obtain any information regarding them, can do so by calling upon or writing to my agent, Mr. Miller, No. 29 Broadway, New York.

ALFRED CHAMBERLAIN.

Newport, R. I., November, 1861.

[Mr. Chamberlain has recently shown at our office some very beautiful specimens of his hanging fruit garden, which was to us a very pleasing exhibition, and enables us to speak of his skill from actual knowledge.—EDS.

Bessemer-Kelly Iron Patent.

MESSRS. EDITORS :—In your number of Nov. 16 you ask if the patent for my air-boiling process can be bought? In reply, I would say, that the New England States and New York would be sold at a fair rate. Should any parties wish to negotiate for the purchase I would be pleased to hear from them on the subject. I removed from Kentucky about three years ago, and now reside at New Salisbury, on the Cleveland and Pittsburgh Railroad, three miles from Hammondsville (my Post Office) and sixty miles from Pittsburgh. Accept my thanks for your kind efforts in endeavoring to draw the attention of the community to the advantages of my process. WILLIAM KELLY.

Hammondsville, Ohio, Nov. 16, 1861.

Vermont Wool Clips.

The Vermont *Register* states that a lot of yearling sheep, belonging to E. S. Howell, of Cornwall, Vt., yielded an average clip of 10½ lbs per fleece, and a lot of two-year olds yielded 12 lbs 14 oz. per fleece. A flock of two-year olds belonging to E. Sanford, of the same place, averaged 16 lbs 6 oz. per fleece; the flock of A. H. Sperry, of the same place, averaged 10 lbs 4 oz. as the growth of 11½ months. Several flocks of F. D. Douglass, of Shoreham, in the same State, have averaged 11 lbs 5 oz. per fleece. In all these cases, the wool was of a superior quality. Such sheep must be profitable, as the wool of American full blooded merinos now brings from 44 to 48 cents per pound, that of three-fourths merino from 40 to 46 cents, and one-fourth merino from 38 to 40 cents. A flock of 100 such sheep averaging 10 lbs to the fleece at 40 cents per pound, yield the handsome return of $400. Sheep can be fed on rough lands where cows would starve. In winter the sheep takes about the same quantity of hay as that required for one cow.

CHAMBERLAIN'S PATENT FRUIT-GROWING BASKET.

Exostosis of a Tooth.

The ingenuity of man has been most fertile in hunting up hard names. The dictionary is full of them, and simple, honest minded people are often amazed to know what it all means. We have a fair sample in the above heading. Reader, don't be afraid to peruse the following statement—the *Exostosis* will be made perfectly plain before you get through.

The following case, reported in the proceedings of the Buffalo Medical Association, affords a striking example of the serious disturbance which may be produced in the animal economy by an apparently trifling abnormity and the beneficial effects of simple but appropriate treatment, Professor Hamilton presented for Dr. C. W. Harvey a specimen of *exostosis of a tooth*. The patient, a gentleman, had suffered for many years from what had been supposed to be neuralgia, which finally produced insanity. Under these circumstances, he was brought to Dr. Harvey to have a tooth extracted. With great difficulty, and only after applying extraordinary force, he removed this tooth, which was found to be sound, but there is seen attached to it, growing from its roots, near the crown, a round, smooth, solid tumor of bone about the size of a filbert. The neuralgia immediately ceased, and the patient was soon restored to sanity.

Is Clay a Mineral?

"All minerals are reserved by land owners in the sale of their lands to railway companies. Where land is bought by a company which requires to be leveled to a considerable depth, to whom does the clay dug out belong—to the company or to the land owner? If to the land owner, the company cannot, after their line is formed, make any alteration in it. For if the clay belongs to the land owner by virtue of his reservation, they have only the privilege of placing or using their line on the clay of the land owner; and if they require any alteration, they must ask permission of the land owner, or, in other words, make a new bargain with him.—F. Mewburn, Darlington, England." To this inquiry, *Notes and Queries* appends the following answer :—"The term clay is applied to hydrous silicates of alumina, derived, for the most part, from the decomposition of felspathic rock, and which are generally rendered impure by the admixture of other substances, such as lime, magnesia, oxide of iron, &c. Other coloring oxides are occasionally present in small quantities in natural clays. Strictly speaking, therefore, clay is *not* a mineral."

Chain Making and Wages in England.

The London *Ironmonger* says that in completing a link of a ⅝-inch chain, a first-rate workman will have to strike about 70 blows with a hammer 2½ lbs weight. The links to be welded are 210, and blows to be given 14,700, in completing one cwt. of chain for the sum of 2s. If he repeat this nine times in the week he gets 18s. From this deduct for his assistant 2s. 6d., for fuel 4s. 3d., for carriage, &c., 1s. 3d., total, 8s.; which deducted from the 18s. leaves the workman 10s. The ½-inch chain maker, in completing one yard, will have to strike not less than 2,180 blows, and not get 1¾d; he has to repeat this sixteen times to complete one cwt. of chain,—that is, 34,880 blows, and links to be welded 334, for 2s. 6d.. If these figures are multiplied by six, the number of links to be welded is 2,004, and blows to be given, 209,280, for 15s.; if we deduct for his assistant 2s. 6d., and for fuel and carriage, 3s. 10d., we find that the workman is left only 8s. 8d. In describing what are called the American traces, the writer says that to complete 100 pairs it requires the labor of the father and three of his family, varying in ages from twelve to seventeen years, one week; they have to weld links, 9,800, the length of which, if joined in one chain, would be 407 yards. There are 200 hooks and 200 swivels to complete this 100 pairs; and when they are delivered at the warehouse the highest figure given is 2½d. per pair; that is, 20s. 10d., from which, if we deduct the expense of fuel, carriage, &c., 6s 6d., there is left 14s. 4d. Out of this, it is assumed that 4s. 3d. has to be paid for rent, and that the remaining 10s. 3d., is to find food, clothing, &c., for a family of ten or more. The miserable pittance which these men earn is less remunerative than at first sight appears, for it should not be forgotten that to earn this money they have to stand all day before a fierce fire, and to forge and beat hot iron. For 3¾d. a day, a child of from eight to ten years of age, of either sex, will stand by such a fire working the bellows from seven in the morning till nine at night. The operative chain and trace makers have just given notice of their intention to demand an advance on the prevailing prices, but it is not thought that their employers will concede the demand.

The invention of a machine to supersede such manual employment, would be a blessing in disguise to these miserably-paid English operatives.

STEAM FIRE ENGINES FOR WASHINGTON.—The Cabinet has determined to order two steam fire engines for the City of Washington, each to be accompanied with several experienced men to operate and take care of it. The fire department in Washington has become disorganized, and this wise action is taken for the protection of the public buildings. Had there been only one steam fire engine on hand, it is stated the Infirmary, which was lately burned down in that city, would have been saved.

SIR WILLIAM CUBITT, an eminent English engineer, died in London on the 20th ult. He superintended the erection of the Crystal Palace in Hyde Park, in 1851. He was a millwright by trade, and was an ingenious mechanic and civil engineer. At his decease he was 77 years of age.

THE steamer *Trent*, of the Royal West India Mail, is 1856 tuns burthen, with engines of 180-horse power. She is one of the old wooden class.

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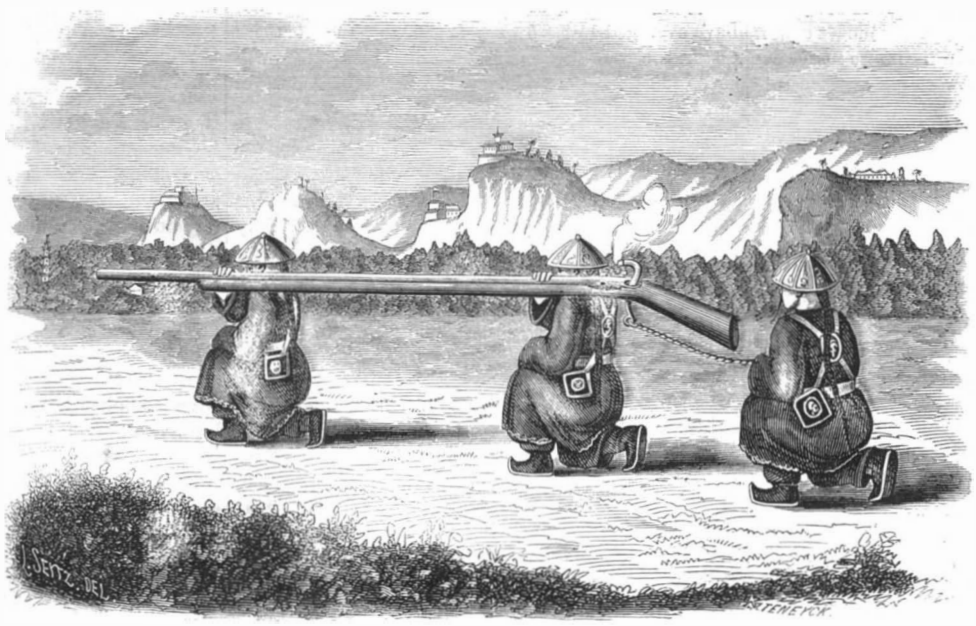
An Asiatic Firearm.

An American gentleman, W. S. Livingston, residing in Shanghae, China, after the capture of the Peiho forts by the English troops went out to visit the battle field, and brought away with him a very curious relic, which is illustrated in the accompanying engraving. It is a Chinese musket, or, as they call it, a jingall. A large number of these had been laid down by the Chinese to form a corduroy road, and Mr. Livingston dug one up, and on a visit to this city brought it with him and exhibited it in our office.

The barrel is 8 feet long and weighs 22¾ lbs., the whole weight of the gun being 28 lbs. It is a matchlock, the cock carrying a slow match which is thrown down into the pan of powder on pulling the trigger, the match being lighted before the aim is taken. It is carried by two men and fired by a third, as shown in the engraving. Sometimes, in fixing it, the breech is placed against the shoulder and the trigger is pulled by the finger instead of by a chain, as shown.

The Chinese doubtless used these muskets for hundreds of years, while English and French armies were fighting with bows and arrows, but western civilization in this, as in so many other respects, has passed by that most conservative of all nations, and a Chinese jingall is a primitive and very inefficient weapon when compared with the arms now manufactured and used in the United States and all European countries.



A CHINESE MUSKET OR JINGALL.

WHICH IS THE BEST WASHING MACHINE?

Our female readers and acquaintances often make of us the above inquiry. We wish we were able to answer it unqualifiedly, but with all our experience in this class of inventions it is difficult to determine which, among the legion of different kinds, is the very best for family purposes. Hundreds of patents have been granted for washing machines. We have solicited patents for machines of this class operated in every conceivable manner, and by all kinds of power—from steam down to dog power—and yet it is impossible for us to state which apparatus is the best. The "Union Machine," patented and manufactured by Jossie Johnson, 447 Broadway, has been used in our families for some time and it gives satisfaction.

A few weeks ago another new washing machine was introduced to the public, which, for family use, promises to become very popular; we allude to the machine of Messrs. Oakley & Keating, illustrated on page 282, current volume of the Scientific American. This machine operates on the plan of a fulling mill, as will be seen by reference to the engraving. We now have one of these last-invented machines in use, and our Ann and Bridget say, after a trial of it for five successive Mondays, that it is the "best washing machine ever made."

Owing to our lack of practical knowledge on the subject of washing we are unprepared to say as much for the machine as our help have expressed, but we fully endorse the girls' honesty in thinking it the best and pronouncing its merits in such positive language. Certainly we know of no machine which, to our mind, excels the principle on which this one is operated. Messrs. O. & K. also furnish a very superior article of clothes-wringing machines on the elastic-roller principle, which may be attached to their washing machine or that of any other.

As a labor economizer we think the clothes-wringing improvements, which have been made for a few years past, are the most important to the housewife and laundress of any domestic utensil invented.

Whitworth's View of Breech Loaders.

Joseph Whitworth, of England, the inventor of one of the best, if not the best, breech loading cannon that has yet been devised, in a recent letter to the London *Times*, makes this remark:—"In 1856, I advocated as I still do, the employment of simple muzzle-loaders for field artillery. It was proved then, by the brass guns I rifled for the government, as it may be proved now by publicly trying them, that it is a grave error to overlook the many advantages offered, both for land and sea service, by the muzzle-loading rifled brass guns."

COBURN'S PATENT SASH FASTENER.

The accompanying engravings represent a sash fastener recently patented by John H. Coburn, of Lowell, Mass., which presents some peculiar advantages. It is self-acting, fastening the sash on closing the window after either the upper or the lower sash has been opened; it is simple, cheap and efficient, and forms a neat ornament to the window. As it can be placed opposite the munnion, it is peculiarly desirable, especially for windows of four panes.

Fig. 1

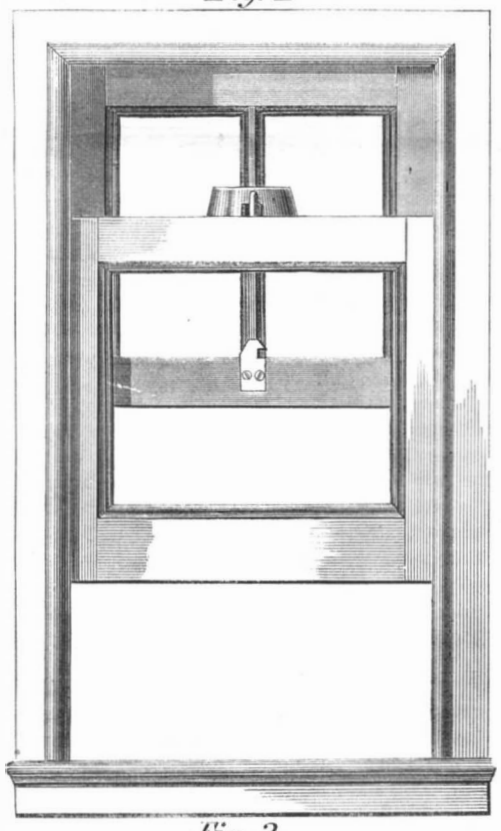
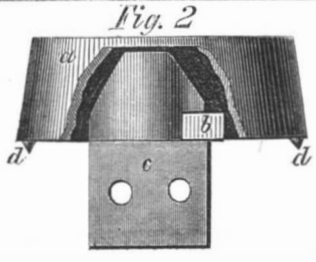


Fig. 2



A cup or case, *a*, (Figs. 1 and 2,) is made of iron bronze, silver, or other suitable metal, with the latch, *b*, pivoted in its center and forced into place by a single screw passing through its center to the upper rail of the lower sash. Upon the front side of the lower rail of the upper sash is secured the catch, *c*, and as either sash is restored to its place, the latch, *b*, is pressed from its position by the beveled edge of the catch till it reaches the notch, which it enters, and thus fastens the two sashes together. In opening the window the latch is forced outward from its hold upon the catch, by pressing the thumb against the end of the latch that protrudes outward from the case. The projections, *d d*, in the lower edge of the case, enter the wood and hold the case from turning.

The patent for this invention was granted September 10, 1861, and further information in relation to it may be obtained by addressing the inventor at Lowell, Mass.

Secret Steel Breastplate.—On page 264, current volume of the Scientific American, we described the secret breastplate of J. S. Smith, of this city, and since that period a great number of inquiries have been made of us respecting it. We would state that all communications on this subject should be addressed to M. A. Benjamin, New Haven, Conn., the sole manufacturer of such armor vest, who is prepared to fill orders for single ones, or by the hundred.

MUNTZ SHEATHING FOR IRON SHIPS.

The name "Muntz Metal" is derived from the late Mr. Muntz, M. P. of England, who first applied brass sheathing, also sometimes called "yellow metal" to ships as a substitute for copper. A patent was secured for the application, and it is stated, the inventor realized a large fortune from it. We learn from the London *Mechanics' Magazine*, that Mr. G. F. Muntz of Birmingham has taken out a patent for quite a novel method of sheathing iron ships. It consists in taking a sheet of iron about three-sixteenths of an inch in thickness, scouring its surface until it is bright, then placing upon it a thin sheet of sulphurized india rubber of the same size, and again laying over this a thin sheet of yellow metal pierced with small holes around the edges. These thin sheets are now placed in a suitable press and cramped together so as to cause intimate contact and exclude the air from between them. While thus held together, they are placed in a chamber where they are subjected to the action of steam and the india rubber becomes vulcanized. In this manner the adhesion of the two sheets of metal, is rendered very perfect. Holes are now bierced through the india rubber and the sheet iron, to coincide with those in the sheet of yellow metal, and the combined sheet is fit to be nailed on the bottom and sides of iron ships which have small holes drilled in them, for the purpose of forming an outside sheathing of yellow metal like that on wooden vessels. Many compositions have been applied to the bottom of iron vessels, to prevent them becoming foul from barnacles and sea weed, but although arsenic, lead and various poisonous substances have been used, they have all failed to give satisfaction. This new method of sheathing iron ships we believe, will answer a good purpose, but its first cost will be objectionable.

Rifle Practice.—We call attention to the remarks of a correspondent on another page, under the heading of "The Rifle Question." The writer of this paragraph, as an old deer hunter, expresses his full accordance with the opinions of "Rifleman," and cordially approves of his suggestions. Practicing at rifle shooting with a rest is ridiculous.

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VOL. V. NO. 22.....[NEW SERIES.]....*Seventeenth Year*

NEW YORK, SATURDAY, NOVEMBER 30, 1861.

FIFTEEN THOUSAND PATENTS SECURED THROUGH OUR AGENCY.

The publishers of this paper have been engaged in procuring patents for the past sixteen years, during which time they have acted as Attorneys for more than FIFTEEN THOUSAND patentees. Nearly all the patents taken by American citizens in FOREIGN countries are procured through the agency of this office.

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No. 37 Park-row, New York.

BUILDING STONES AND THEIR PRESERVATION.

It is always a subject of general regret when some well-known structure, distinguished for its beauty and the architectural purity of its style is seen going prematurely to decay. In most cities there may be seen costly buildings—such as some of the churches in New York—the most ornamental parts of which have assumed a faded and worn appearance, in a very few years after their erection. No building of the present day, however, has excited so much wide-spread attention respecting its early dilapidation as the new Houses of the British Parliament, in London. They were erected only a few years since on classic ground, and are distinguished for their imposing dimensions and ornate architecture. It was supposed that the elaborate and delicate tracery on their walls would have remained for ages, "untouched by the hand of time," as monuments of the architect's taste and the sculptor's skill; but the stones are already crumbling, and the structure "hastens to decay." To arrest, if possible, the future disintegration of this splendid pile the British government appointed a commission of scientific and experienced men to investigate the cause of decay, and ascertain, if possible, the remedies that may be applied, and report the result of their labors. The report has lately oppeared, and as some of the information which it contains is of general importance we give its substance.

Building stones are divided into two classes: first, those consisting of substances not easily acted upon by acids; second, those composed of materials which are partially or entirely acted upon by acids. To the first class belong granite, porpheries and serpentine; to the second, limestones, dolomites, and certain sandstones containing carbonate of lime as a cementing agent. The stones of which the new Houses of Parliament are built belong to the second class, and are composed almost entirely of the carbonates of lime and magnesia. Regarded from a purely chemical point of view, the resisting power of stones to the corroding action of the weather would appear to depend entirely upon their chemical composition; but there are other conditions equally important in determining the durability of building stones. Chemical substances under different conditions possess very different properties. Thus, marble and chalk are chemically identical, but one is crystalline, the other amorphous, and the former is much less readily acted upon by acids than the latter.

Stones in buildings are subject to both mechanical and chemical action. Those which are very porous and absorb moisture are liable to disintegration, when the moisture freezes in their pores, and splits their cells. There is always some carbonic acid in the atmosphere, and when rain water contains a portion of it, a powerful solvent action is exerted upon exposed magnesian limestone. In cities, where bituminous coal is used for fuel, a small quantity of sulphuric acid is found in the atmosphere, and when this is combined with rain it acts as a powerful solvent upon magnesian limestone. Two kinds of stone come under the ban of science for expensive buildings in cities, namely, very porous sandstone and magnesian limestone.

No stone should be chosen for a costly structure unless it is known to be proof against atmospheric disintegration. But this advice affords little consolation to those who have erected expensive buildings under the impression that the materials were perfectly durable, but which are now rapidly undergoing premature decay. What is the remedy to check the decay, is the all-important question. We have very little, if anything, by way of answer. The inquiry has been made of us frequently respecting the preservative character of silicate of soda (soluble glass) for such purposes. Soluble glass has been applied to stone in the form of a concentrated wash, and afterward washed with chloride of calcium, to effect double decomposition and precipitate an insoluble substance in the pores of the stone. Thus far permanent results have not been achieved with this substance. Parraffine, beeswax and resin dissolved in volatile oils have been recommended for experiment as preservative agents by distinguished professors of chemistry in London; but while these will undoubtedly close the pores of decaying stone, they are certainly not superior to prepared linseed oil and paint for this purpose. What is wanted is some chemical agent which, when applied, will render decaying building materials as durable as those of the most permanent structures. There is still an extensive field for experiment and investigation in this department of the arts.

SAND, SOAP AND GLASS.

The difference between chemistry and mechanics can be very clearly explained by the changes produced on sand. Thus, if we take a piece of quartz and reduce it to powder it becomes sand. This is simply a mechanical change, the sand remaining of the same nature as it was prior to its being reduced to dust. Silica is the chemical name for quartz, and it is one of the most refractory substances known. It is perfectly insoluble in water, and neither sulphuric, hydrochloric nor nitric acid will dissolve it. It is also so infusible that it cannot be melted by any heat obtained by the blow-pipe; and yet this substance, so hard, so infusible and insoluble, can readily be converted into soap and made to melt like wax through the subtle agencies of chemistry. By taking some sand and mixing with it a portion of caustic soda—carbonate of soda and lime—and submitting these substances to a very high heat in melting pots placed in a furnace, it fuses and becomes glass. In its molten state it is blown into bottles and vessels of every variety of form, and is also converted into sheets for window panes, and molded like clay for many other purposes.

Glass contains just a sufficient quantity of alkali to render it fusible, but not soluble, as neither water nor the three acids named dissolve it; indeed, glass is the substance commonly used for containing those very corrosive acids and for this purpose it is of inestimable value to the arts. The change produced by the soda on silica is a chemical one. The molding of glass, when fused so as to change its form, is a mechanical principle; the action of the soda upon the silica in conjunction with the high heat in the furnace, whereby the silica is made fusible, is a chemical one, and the compound thus formed, which we call glass, is a silicate of soda. A still more wonderful change than this is effected if an excess of caustic alkali is combined with the silica, as it then forms what is called "soluble glass," a substance which will dissolve by being boiled in water. Soluble glass (silicate of soda) is best formed by boiling finely subdivided sand in a very caustic lye under steam pressure, so as to subject the silica to the highest possible temperature, as this tends to form more concentrated solutions of the silica. This is also a chemical change. The hard silica, formerly so insoluble, unites with the excess of alkali and really becomes a soap which is now used in Prussia and some other places for washing purposes. The silica takes the place of tallow, oil and grease, which are used for making common soap, and uniting with the alkali it becomes soluble in water, and may be used for washing as an inferior saponaceous compound. Such are some of the mysteries of chemistry.

Silica is one of the most common and useful substances in nature. It is the constituent of many rocks and composes most of the pebbles in gravel beds. Rock crystal is pure transparent quartz, and its name is derived from *krustallos*, a Greek word signifying ice. Silica is the base of a great number of precious stones, such as the carnelian and sardonyx, which are bright red; also the opal, &c. We are entirely dependent upon silica for our present advanced position in some of the arts. It forms the lenses of the telescopes by which such advances have been made in astronomy, and from it the lenses are made for our most improved system of lighthouse illumination.

Spectacles, those aids to the aged, are also formed of it, also our windows and looking-glasses; in short, silica is applied to numberless purposes in all the philosophical, useful and elegant arts. The "little grains of sand" have become mighty agents in the hands of cultivated man. It is said, however, that the ancients were acquainted with the art of making malleable glass—an art which, if it ever existed, can be re-discovered.

M'CORMICK'S EXTENSION AGAIN—PERSONAL.

Commissioner Holloway, in his decision of the McCormick extension case, published on page 295, took occasion to criticise the conduct of the attorneys, Messrs. Lee & Fisher, who conducted the opposition. Our readers will remember that in our review of tho case we defended these gentlemen from the charges alleged against them, basing our remarks wholly on the premises laid down by the Commissioner. In a letter addressed to us on the 16th inst., Messrs. Lee & Fisher express their thanks that we should have defended them, especially inasmuch as they were strangers to us, and that we acted without solicitation. We are happy to find, also, that Commissioner Holloway, upon further investigation of the facts, has made the following correction, which now appears of record in the office, following his opinion, and made part thereof:—

PATENT OFFICE, Nov. 7, 1861.

Since the publication of the foregoing opinion I have received a communication from Lee & Fisher, per S. S. Fisher, in which it is declared that the letter above referred to "was the only letter of the kind written, and the expression, 'defeated in the Patent Office,' referred only to the legitimate use of the funds, under our agreement (with our clients, herewith inclosed), for the purposes therein specified." It is due to the parties named that I should give them the benefit of this their disclaimer, and, regarding it as satisfactory, I do so by making it a part of my recorded opinion.

D. P. HOLLOWAY, Commissioner.

It affords us pleasure to publish the Commissioner's correction. It is certainly creditable to his candor.

OUR NAVY AND ITS GALLANT COMMODORE DUPONT.

The name of Commodore Dupont will hereafter stand side by side with those gallant worthies who have made our navy glorious in former times. He has long been regarded as a master spirit in the navy, wanting only an opportunity to show his skill, which he has done in a signal manner in his successful bombardment of Forts Walker and Beauregard at the entrance to Port Royal harbor. It is accounted a dangerous experiment for wooden-walled ships to attack forts or earthworks, as it is generally conceded that one gun on land is equal to five on shipboard. The Confederate General Ripley in his orders summed up his instructions with this declaration:—"To give up a position on shore while the enemy is afloat, is totally and absolutely inexcusable."

In spite of all the disadvantages attending such attacks the brave Dupont went resolutely to work to bombard the enemy's works, and in his letter to Capt. Fox, Assistant Secretary of the Navy, modestly declares that he "*thought his plan a clever one.*" We

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have no doubt the enemy thought so too when the terrific shower of exploding shells fell upon them, knocking their guns about in the wildest confusion. Instead of anchoring his fleet and blazing away at the works, he kept his ships in motion, thus securing the use of both his broadsides, which kept the guns from heating by the alternate fire, and enabled the men to work to greater advantage in their quarters. A fort on shore is a large stationary object, and may be hit anywhere, while a ship is comparatively a small mark, and by keeping it moving the enemy's gunners were prevented from getting an accurate range, thus disappointing Gen. Ripley, who ordered the artillerists just how to fire, and where the shot would do most execution.

The report says that the enemy felt confident that he could annihilate the fleet in case it should attempt to pass the forts into the harbor. When Commodore Dupont's fleet had described the arc of a circle about the forts three times, keeping up a terrific cannonade, and was about to pass the fourth time, without showing signs of exhaustion or defeat, the Confederates thought it about time to leave, and they did so in a most precipitate manner.

Dupont's plan of the engagement was laid down after a careful reconnoissance of the enemy's works and position. It combined all the points which great commanders have endeavored to secure, viz., security and superior destructive opportunities for their own forces, with surprise, derangement of plans and inferior destructive opportunities to the enemy.

This attack and its successful results is one of the most brilliant victories ever achieved by our navy, and must tend to elevate it in the eyes of all nations.

SUBJECTS FOR INVENTION.

For the convenience of our inventive readers, we subjoin a catalogue of subjects or problems that may, we think, be advantageously conned over with a view to further discovery or improvement. We propose to publish this catalogue quite frequently, by way of reminder to our ingenious friends, and we shall also from time to time make additions to the list. We shall always be glad to receive suggestions of new subjects to be added to the column from any of our readers.

Patents for improvements connected with the subjects here indicated would no doubt prove of value.

A SMALL LOCOMOTIVE FOR FAMILY USE—suited to run on common level roads, to be light, safe, neat, convenient, easily managed by any person and not expensive to run. Great speed not essential.

AN INSTRUMENT TO INDICATE THE COMPARATIVE PURITY OF THE ATMOSPHERE—We already possess the thermometer which shows the temperature; and the hygrometer which tells us the comparative dryness or moisture of the air. We now need a simple instrument that will indicate to the eye whether the air in our rooms is pure or impure.

A POROUS SUBSTITUTE FOR LEATHER—Many excellent substitutes have been invented, but most of them involve the use of gum, paint or some water-proof substance, so that the article produced is unfit for the feet, and for other purposes to which leather is applicable.

A PULSE INDICATOR—A small instrument for the sick room, capable of application to the wrist of the patient, to show and record the number of pulse beats.

A CHEAP METHOD OF PREPARING THE METAL MAGNESIUM—This metal possesses the remarkable property of burning with a most brilliant light when held in the flame of any common lamp or candle. The light thus produced far excels that of gas or coal oil; but the great expense of producing the metal is the obstacle which stands in the way of its employment. It is believed by many persons that if some cheap method of producing the metal can be invented, the magnesium light will come into general use. Here is a fine problem for amateur chemists.

SUBSTITUTE FOR BREAD YEAST—A family instrument or machine for impregnating bread dough with carbonic acid gas, and thus avoid the necessity of using yeast.

A MUSICAL INSTRUMENT—An improvement in musical instruments, so made that by passing a sheet of paper or other object through the instrument, the desired tune will be produced. The object of this improvement would be to enable every family to enjoy the latest and best music, or such selections as might be desired, without the requirement of educated manipulation of the instrument. The sheet or object by which the changes of sound are effected must be cheap and easily produced.

A CLOTHES DRYER—A drying frame for clothes capable of being projected from the windows of dwelling houses.

AN ARMOR-CLAD WAR VESSEL—Light of draft, cheap and quick of construction. As the iron-plated ships have been thus far constructed, Sir Edward Belcher thought that even a well-constructed wooden ship, striking one fair across the bows, would cause such a shock as to sink the armor-plated vessel. And he declared that if he were hard-pressed, he should have no objection to try it. Indeed, he seemed to think that "compressed brown paper was one of the most powerful repellants of shot, and might be advantageously tried." Something better is needed in this line than has yet been brought out either in Europe or this country.

A POCKET TELEGRAPH INSTRUMENT—To be operated without connecting wires; capable of being carried in the pocket like a watch, and to be in sympathetic relation to another similar instrument possessed by a distant friend or correspondent.

AN ARMOR DRESS—Of little weight, capable of being worn under the ordinary garments, and of sufficient strength to resist musket and pistol balls.—Something better in this line than has yet been invented would sell at this time very readily.

AN ATTACHMENT TO GUNS TO CUT THE ENDS OF CARTRIDGES—At present the soldiers tear the cartridges with their teeth, but the niter and sulphur contained in the powder occasions diseases in the mouth and loss of teeth, besides causing the most acute thirst to the soldier during battle.

SUBMARINE MACHINES—A very important field for ingenuity is the discovery of an efficient method of preventing the entrance of vessels into harbors by submarine machines or explosives.

WATER PIPES—A material for making pipes for conducting water, not metallic, but pliable and capable of being bent in any direction.

A TENT FOR ARMY PURPOSES—Capable of being quickly converted into a substantial boat, for carrying troops across rivers.

A SADDLE AMBULANCE—For mules or horses, capable of ready adjustment so as to remove the wounded from the field of battle.

TRIAL TRIP OF THE STEAMER CONSTITUTION.

At 2:40 P. M., of the 16th ultimo, the steamship *Constitution*, belonging to the Pacific Mail Steamship Company, started for Boston upon a trial trip, with a select company of guests, professional and non-professional. The vessel is the largest built since the days of the *Grand Admiral* and *Adriatic*, and exceeds the former vessel in her proportions. She is intended for the Pacific trade, and has a beautiful hull, combined with great motive power. From these two specialties extraordinary results in speed were expected. The length of the *Constitution* is 364 feet, by 45 feet beam; her tunnage—carpenter's measurement—is 4,400 tuns, with capacity for 3,000 troops and their necessary baggage. Three thousand souls, exclusive of the crew required to manage the vessel, are enough to be called a respectable town in any part of the world, and to feed, transport and care for such a body of men daily requires great forethought and experienced officers. These are as follows:—Captain A. T. Fletcher, three other officers, boatswain and 22 seamen. The ship is brig-rigged, and carries ordinarily 12 life boats—on this occasion she was provided with 6 additional ones. Wind sails and ventilators are distributed liberally throughout the vessel. The comforts and convenience of the passengers have been well provided for by the proprietors. The fittings are of a luxurious character, the furniture of comfortable and elegant design, and the state rooms are commodious and cheerful. If we add to this the comforts in the way of baths and barber shops, and the light afforded at night by the mechanical lamps which light the main saloon, one sees that an able mind has superintended the building of a ship embracing such various details. The machinery of the vessel is of the most massive and powerful description. A steam cylinder, of 105 inches diameter, by 12 feet stroke of piston, furnishes the motive power to the ship through wheels 40 feet diameter by 10 feet face. There are in addition 6 auxiliary engines for various other purposes, such as pumping up water to the boilers, blowing the fires, &c. The boilers are 4 in number, and of the return-flue pattern. They contain 5 furnaces, and 3,500 feet of fire surface each. They consumed upon this trip 47 tuns and 980 pounds of coal per day, with an average steam pressure of 15 pounds per square inch, and 11 revolutions of wheels per minute, with throttle valve half open. Average vacuum, 28 inches. The speed of the vessel with wind part of the time ahead and the rest abeam, was 12 knots per hour—knots meaning nautical miles. The chief engineer is Mr. Wm. Vanderbilt, an officer of great experience; his assistants are Messrs. Sparks, Reed and Reynolds, in the order of their rank, with 36 firemen, coal heavers, &c. The main engine is of the beam variety, and furnished with an enormous Sewall surface condenser, containing upward of 5,500 brass tubes, three-fourths of an inch in diameter. The public are familiar with the capacities of this apparatus, but it is not amiss to state that this particular one is able to distill 30,000 gallons of fresh water per day from sea water, or to pump out the vessel's weight in three hours, from her hold, using, of course, her two pumps—air and circulating—to accomplish that end. In the language of Captain Fletcher, "a hole in the vessel as big as a rice tierce would be of little inconvenience." Although the engine was entirely new, and just as it came from the Novelty Works, it was never stopped or slowed from the time of leaving New York until it reached Boston Light and the vessel anchored, which fact alone is creditable. Nothing could exceed the smoothness and regularity of its performance. Steam is worked expansively upon the *Constitution*, and an ingenious and simple apparatus, devised by the Novelty Iron Works, permits the valves to drop at any required point of the stroke. It consists merely of the ordinary rock shafts and their several toes for working the valves. The steam toes, however, have a slot in their ends which permits a sickle-shaped apparatus (also working on the rock shaft, but not fixed thereto,) to run through them. From the ends of these toes project steel catches, which pick up the steam valves—the catches being disengaged from the valves by the sickles aforesaid, they having one side peculiarly shaped, and which cannot be described, for that purpose. These sickle arms can be placed at all points where it is desirable to cut off the steam. The whole apparatus worked successfully, and without causing any anxiety to the engineers. Those who are prejudiced against a surface condenser, and opposed to improvements, should have seen the Sewall condenser perform its functions; never ceasing in its duty, it condensed the whole steam admitted to it, and maintained a most extraordinary vacuum, without leak or loss. It is difficult to conceive of any opposition to a machine which can be used either as an old-fashioned jet or as a surface condenser, doing twice the duty of the former. Mr. George C. Shelley is at the head of the culinary department of this ship, and has contrived an ingenious apparatus, which cooks the rations and makes the coffee, for the 3,000 troops for which the vessel is provided, in the same space of time that this is usually done for ten men. Incredible as this statement may appear, it is true, as any one can satisfy himself by examining the fixtures. We are indebted to this gentleman for many personal attentions. Dr. Normandy's condenser, for making aerated fresh water, is in use, and was highly successful in its operation, making the drinking water for the vessel.

Through all the brisk gale which prevailed during the entire passage, not a drop of water came upon deck, nor was the motion of the vessel extraordinary under the circumstances. The powerful engine performed its revolutions with as much regularity as on the smoothest sea. At every rise and fall of the cumbrous piston the requisite lead met it and imparted successive strokes, which urged the steamer on with strong and sturdy impulses. The sound of the exhausting steam, the monstrous beat and thump of the rubber valves, and the singing of the boilers seemed like the sigh of some pent-up monster. Long ago in the Arabian Tales some eastern writer depicted the fable of the genius imprisoned in the sealed box, who gave whatsoever was required. To-day the fiction becomes fact, and the genius is safely confined in the lever which moves the world. The whole running time of

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the trip from New York to Boston, by the outside route, was 29 hours and 30 minutes, and those who are qualified to judge of the vessel pronounced her working admirable.

A meeting of the guests took place in the main saloon, after the trip, at which complimentary resolutions were adopted, and cheers given for Captain Fletcher. Among the guests were, W. H. Webb, Esq., Howard Potter, Esq., Wm. E. Everett, Esq., and Captain Ezra Nye. Mr. Sewall, the inventor of the condenser used, was also present. The cost of the vessel and machinery was not made public, but cannot be less than half a million of dollars. The guests will long have reason to remember the pleasant trip made by the *Constitution* and the bounteous hospitality of her proprietors.

INDEX OF WAR AND NAVAL INVENTIONS.

We are frequently asked to furnish descriptions of the various kinds of war implements which have been invented, and such as are now in practical use by the government. Nearly all the inventions which have been made and introduced into the War and Navy Departments have been published in the SCIENTIFIC AMERICAN, and for the convenience of inquirers we append herewith an accurately prepared list of subjects illustrated since the commencement of the present volume, (July 1st). In the former volume we illustrated a large number of war subjects, many of which have been introduced into the service.

Besides the illustrations presented, we have furnished a very extensive summary of useful information concerning the art of warfare, such as cannot be found in any other publication.

We have here a list of engravings comprising cannon, rifles, projectiles, war vessels, camp utensils and military equipments generally; in fact, all that is needed to prepare our soldiers and sailors to arm and equip in defence of our Union and the glorious flag.

This index does not include descriptions of many improvements which have been published in these columns, but only those which are accompanied with engravings to illustrate the inventions more fully.

1.—Privateer *Savannah*, in one figure, on page 4.

2.—Sigourney's Rifle Projectile, three figures, p. 5.

3.—Smith & Wesson's Breech-Loading Rifle, four figures, p. 8.

4.—Cochrane's Rifle Cannon Shell and Shot, two figures, p. 24.

5.—Bathe's Shields for Ships, two figures, p. 32.

6.—Hirchbuhl's Vent-Stopper for Cannon—Cannon and Gunner—one figure, p. 33.

7.—Rodman's Cannon Powder, one figure, p. 53.

8.—Gun Lock—Hillier's—with Pistol, two figures, p. 56.

9.—Electric Cartridges for blasting, six figures, p. 64.

10.—Parr's Camp Chest, showing table, dishes and tools, two figures, p. 65.

11.—Chinese Cannon—regular antique breech loader, one figure, p. 80.

12.—Map of Bull Run Battle-Field, one figure, p. 82.

13.—Chinese Jingall—small cannon—one figure, p. 87.

14.—Shrapnell Shell and Fuse, two figures, p 88.

15.—Submarine Infernal Machine, found in the Potomac river, one figure—ship and machine, p. 101.

16.—Sawyer's Projectile, used at Fortress Monroe, two figures, p. 112.

17.—Machine for Rifling Cannon, showing the operation, in one figure, p. 113.

18.—Chariot Shield for Soldiers, with companies of soldiers marching behind the shield, two figures, p. 128.

19.—Stevens's Marine Battery and Iron-Clad Frigate, the parent of iron-clad war ships, three figures, p. 129.

20.—Target of a Crack Rifle Shooter, one figure, p. 132.

21.—Schubarth's Breech-Loading Rifle, showing cartridge lock, four figures, p. 136.

22.—Babcock's Spiral-Formed Cannon, five figures, p. 160.

23.—Spanish Rifled Cannon and Shot, in two figures p. 166.

24.—Slinging and Working Guns on Ships—Scott Russell's plan—in three figures, p. 168.

25.—Gault's Expanding Projectile, four blades expanded and "clear the way," three figures, p. 168.

26.—Russell's mode of building Iron War Ships, in eight figures, p. 176.

27.—Inside view of a new Gun Boat, one which has since done good service at Port Royal, one figure, p. 192.

28.—Army Spy Glass for measuring distances, two figures, p. 200.

29.—Jones's Angulated Iron War Ship, one figure, p. 225.

30.—Spear Projectile—Brown's—one figure, p. 225.

31.—Howe's Army Scale for weighing, two figures, p. 232.

32.—Canteen—Montgomery's—three figures, p. 240.

33.—Henry's British Prize Rifle, three figures, p. 244.

34.—Winslow's Semi-Steel Cannon, shot, shell and target, six figures, p. 273.

35.—Winslow's Bomb-Proof Armor for War Ships, four figures, p. 276 and 277.

36.—Rockwell's Combination Union Army Camp and Chest, tables, box, stove, &c., three figures, p. 280.

37.—Ball's Army Chest and Stove, Table and Box, three figures, p. 296.

38.—Ashold's Camp Stool, three figures, p. 296.

39.—War Steamer *Merrimac*, sunk at Norfolk, raised, and now covered with iron plates, and made into a Marine Ram, in one figure, full view, p. 304.

40.—Chinese Long Musket, one figure, p. 344.

TO OUR EDITORIAL BRETHREN.

We send a copy of this week's issue of the SCIENTIFIC AMERICAN to every newspaper published in the United States accessible to us through the mail facilities of Uncle Sam, and we take this occasion to thank our brethren of the press for their uniform courtesy toward us ever since we commenced the publication of this journal. Your friendly aid, thus cordially extended, has aided us materially. We acknowledge it with gratitude, and still further appeal to you to speak a good word to your readers in our behalf. To all such journals as publish our prospectus in their columns we shall send the SCIENTIFIC AMERICAN one year without an exchange.

Paging Account Books by Machinery.

John McAdams, of this city, is the man who has made the paging of account books by machinery a practical art. Ten years ago he invented his first machine, and he has been engaged since in making improvements upon it. After eight years' use, he happened one night to think of the plan for carrying down the leaves as they are successively paged, by means of a little revolving finger; and this slight modification very largely increased the capacity of his machine. On another page will be found an illustration of his machine, embracing the latest improvements. It is a beautiful piece of mechanism. We have seen it in operation, and can say that it works in a rapid and perfectly successful manner, paging the books with the greatest neatness and regularity.

COAL OIL, PAINTS, &c.—Our readers will find in our advertising columns the advertisement of Messrs. Raynolds, Devoe & Pratt, who are extensive importers and dealers in paints, oils, varnishes, colors, &c. We take much pleasure in speaking of these gentlemen as being in every way reliable and upright merchants of long standing, and who are probably the most extensive dealers in their line of business in the United States. They have issued a comprehensive catalogue of their goods with prices attached, as far as it is practicable to do so.

THE CALIFORNIA TELEGRAPH TARIFF.—The rates fixed from St. Louis are as follows:

First 10 words	$4 25
Next 90 words (each)	36
Next 400 words (each)	24
Next 500 words (each)	18
After 1,000 (each)	12

These rates are in conformity to the act of Congress. From New York, Boston, and other Eastern cities, the usual rates to St. Louis are added.

THE second British great iron-clad frigate, *Black Prince*, lately made a trial trip, when she attained a speed of 17 knots per hour in smooth water.

NOTES ON FOREIGN INVENTIONS.

Rolling Iron.—J. G. N. Alleyne, England, has obtained a patent for applying two steam engines to operate the rolls in a rolling mill—the one set for operating the rolls in one direction, and the other for moving them in the contrary direction. In rolling iron into plates, or bars, or T and angle iron, it is necessary that the rolls should be moved with great rapidity to accomplish the work while the iron is hot. When the rolls are rotated in one direction, one engine is thrown off and the other thrown on for the reverse motion, so that each engine is alternately getting up speed and accumulating work in the fly wheel for the next rolling operation. The arrangement also obviates the necessity of toothed gearing for the rolls, an important advantage.

Fixing Varnish on Glass.—R. A. Brooman, of London, has applied for a patent to prevent lac and other varnish from cracking off when applied to glass, by simply applying paste made of rye flour to the glass first, then before it is quite dry laying on the varnish, which is afterward dried in a warm apartment.

Reproducing and Varying Drawings.—M. M. A. Huray and H. Leile, of Paris, have patented an instrument denominated a goniometroscope, by the aid of which patterns of flowers, lace and other small objects can be multiplied and reflected at any given angle, from a triangle upward. The instrument consists of wood, opening like a book. The two sides forming the case are hinged at the back, so that when required they will stand on end, the back being in a vertical position. The sides are each covered on the inside with a thin sheet of copper plated with silver, and burnished. These serve as reflectors, and the reflection is intended to be made in the very center of the pattern. A protractor—a half circle marked off in degrees—is secured at the top of one side of the case, at a short distance from the hinged back. By this the different angles can be readily found, the protracted being held firmly by a small holder, having a regulating screw on the other side of the case. Through each side of the case, near the opening part, there passes a vertical needle, having a head upon it. A screw is cut upon this needle, and it takes it into a thread in the hole of the case through which it passes. This needle is a little longer than the case, and by turning its head it can be made to enter the pattern and thus steady the instrument. When the angle is to be changed, or the instrument closed, the points of the needles are withdrawn into the case, by turning their heads. By placing a pattern or design to be copied for sewed muslin work, or for printing so as to enlarge it, the pattern is placed on the table between the leaves of this case, and it is reflected from its polished reflectors upon a piece of prepared paper set in proper relative position to receive it above. It is a convenient instrument for those engaged in enlarging intricate designs for manufacturing purposes.

Opening and Closing Port Holes.—C. Burn, London, has taken out a patent for opening and closing port holes of ships and forts in a rapid and easy manner, to prevent the entrance of missiles from an enemy and yet permit the quick firing of cannon from within. The port hole is covered with two doors, arranged like the upper and lower sash of a window, and then hung and balanced nearly in the same manner as a window sash, with a chain and weight. These two iron doors are set, the one to move in a recess in the ship's side (or in the wall of a fort), above the port hole, and the lower one into a like recess below the port hole. These doors are made of very thick iron, so thick that shot or shell can not penetrate it, and they are operated inside. Being balanced by counterweights, they can be opened and closed with ease and with great rapidity. Whenever a gun is discharged the port is at once closed, and when the gun is again loaded the port is at once opened and the gun discharged. The upper door is hung on chains, which pass over two pulleys on the lower door, to which they are fastened, and by this means the weight of one door balances the other, and they move simultaneously. The face of these port hole doors is angular, to deflect the shot.

COLONEL GOWEN, our enterprising countryman, has now succeeded in raising eight war steamers, one fifty-gun frigate, three corvettes, twelve gun brigs and several smaller craft, in the harbor of Sebastopol. All these have been raised entire and floated.

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RECENT AMERICAN INVENTIONS.

The following inventions are among the most important of those for which patents have recently been granted, and which will be found recorded in our List of Claims.

Hand-Mowing Machine.—The object of this invention, patented by L. M. Doudna, of Amherst, N. H., is to obtain a simple and efficient mowing machine, to be operated by hand; one that can be operated or shoved along by a single person with facility and perform good work. The invention is more especially designed for mowing lawns and meadows containing trees, around which an ordinary mowing machine drawn by a team could not be made to operate to advantage. The invention consists in mounting an ordinary hand frame on wheels, the axis of which is provided with a serpentine cam, said cam, as the machine is shoved along, operating or vibrating a bar, having a segment cutter at its outer end, and which works over a segment cutter plate.

Machine for Pegging Boots and Shoes.—This invention, patented by Moses Marshall, of Lowell, Mass., relates to a device for pegging boots and shoes by manual operation, and has for its object the facilitating of the work, enabling the same to be performed much more expeditiously and perfectly than by the exclusive manual process of punching the soles and driving the pegs therein. The invention consists in the employment and use of an awl, punch and feeder, combined and arranged to operate in such a manner as to effect the desired end.

Improvements in Ordnance.—The principal object of this invention, patented by William Page, of New York city, is to obtain in a gun of smooth bore the advantages derived from a rifle bore, viz, the rotary motion of the projectile about its axis, with a less costly combination of the gun and projectile, less wear and tear of the gun, and less liability to windage; and to this end this invention consists in furnishing a gun, at or near its muzzle, with one or more pins or short protuberances projecting from the surface of the bore toward the axis thereof, to enter spiral groves in the exterior surface of the projectile, which is to be of sufficient length to reach from the charge of powder or packing to the muzzle, or to a point in front of the said pins or protuberances.

Applying Fuse to Projectiles.—This invention, patented by R. P. Parrott, of Cold Spring, New York, is more especially intended for the explosive projectiles of elongated form usually thrown from rifled cannon, and which move with the point forward; and it has for its principal object to make the same fuse serve either as a time fuse or a percussion fuse, as may be desired, the fuse employed being the paper fuse commonly used in shells, or of any other suitable kind, and the use of fulminates being dispensed with. The said invention consists in providing in the projectile, on each side of the hole, commonly known as the fuse hole, a hole for the reception of the fuse intersecting or meeting the first-named hole in a transverse direction. In connection with this transverse hole for the reception of the fuse, there is employed in the first-mentioned hole to effect the explosion of the projectile by percussion, a movable plug, plunger or other piece of metal suitably applied to break the fuse when the projectile strikes, so that the fire from the fuse, which is ignited by the fire of the gun, may communicate with the charge of the projectile; but this plug or piece may be omitted when the fuse is to be used as a time fuse.

Water Closet.—This invention, patented by F. H. Bartholomew, of New York city, relates to an improved water closet of that class which are provided with metal hoppers attached directly to the trap The object of the invention is to so combine and arrange a hopper, trap, trap screw or opening and floor flanch that the trap may be screwed to the floor and made to serve the double function of a trap and stand or support for the hopper, the trap at the same time admitting of being cleansed when necessary with the greatest facility. The invention also has for its object the attaching of the wooden seat to the hopper in such a way that no other support will be required, and the whole device thereby rendered capable of being put up or adjusted for use independent of extraneous fixtures or framing hitherto required to sustain the seat. The invention has farther for its object the concealment of the contents of the trap, a desirable feature in using the water closet.

ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING NOVEMBER 5, 1861.

Reported Officially for the Scientific American.

PATENTEES, READ THIS.

The new Patent Laws which went into force on the 2d of March last, authorized the Commissioner of Patents to have all the specifications which form part of the Letters Patent printed.

This is a wise provision, and it renders the documents much handsomer than the old system of engrossing them on parchment; besides, in passing before the printer and proof reader, the clerical errors, which were often made by the copyist, are mostly obviated, thus rendering the patent more likely to be correct.

But to afford the printer and proof reader an opportunity to do their work properly, the Patent Office is obliged to withhold the Letters Patent after granting them, from *four to six weeks* after the claims are published in the SCIENTIFIC AMERICAN.

*** Pamphlets giving full particulars of the mode of applying for patents, under the new law which went into force March 2, 1861, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

2,624.—Benjamin Andrews, of Philadelphia, Pa., for Improvement in Army Trunks:

I claim the folding platform, B, in combination with the mattress, A, tray, D, and drop leg, f, the same being constructed and arranged to operate together in combination with a trunk, whether closed or opened, substantially in the manner described and set forth and for the purpose specified.

And in combination with the said platform, B, mattress, A, tray, D, and drop leg, f, constructed and arranged to operate as described, I claim the legs, h h, attached thereto, so as to operate in the manner described and set forth, and for the purpose specified.

2,625.—John P. Avery, of Norwich, Conn., for Improvement in Trusses for Bridges:

I claim the combination of two sets of braces standing upon two base chords, and terminating at the top in one chord, forming a truss. And also the combination of two or more trusses thus formed by making one set of braces in each truss unite or stand on the same base chord, the whole being constructed substantially as described and for the purposes set forth.

2,626.—H. W. Ball, of New York City, for Improved Cook Stove and Camp Chest Combined:

I claim a cook stove, C, and boiler, D, when constructed and arranged to fit one within the other, and to contain the necessary culinary vessels, dishes, &c., when said stove is used in connection with a camp chest, A, and combined therewith, substantially as and for the purpose set forth.

[For description of this invention see page 296 of the current volume.]

2,627.—C. H. Ballard, of Worcester, Mass., for Improvement in Breech-Loading Fire Arms:

I claim, first, The breech, B, composed of a long block with shoulders, a b, fitted to corresponding shoulders, e f, within the breech supporter, A, and arranged in combination with a lever, D, to move upward and downward, as well as longitudinally within a parallel-sided cavity in the said supporter, under the control of guides, d d, above and below its rear portion, all substantially as specified.

Second, The arangement of all the parts of the lock of breech-loading rifle or other small arm within a slot in the movable breech, substantially as specified.

Third, The link, E, having a protuberance, e, applied in combination with the lever, D, the breech and the hammer, for the purpose of bringing the hammer to half cock by the act of opening the breech, substantially as specified.

Fourth, Combining the lever, F, with the hammer, H, by means of a horn, n, or its equivalent, substantially as and for the purpose specified.

[This invention consists in a novel construction and mode of applying a movable breech for breech loading; also in the arrangement of all the parts of the lock of a breech-loading firearm, within a slot in the movable breech; also in certain novel means of bringing the lock to half-cock by the act of opening the breech; and further in certain means whereby the cartridge-drawing device, after having drawn the discharged cartridge case, is returned to a recess within the barrel, out of the way of the movable breech and lock, by the force of the main spring of the lock acting through the hammer.]

2,628.—F. H. Bartholomew, of New York City, for Improved Water Closet:

I claim, first, The combination of the trap, A, hopper, B, opening, h, provided with the cap or lid, j, and the flanches, e f, either or both, at the lower part of the trap, all being arranged substantially as and for the purpose set forth.

Second, The flanch, C, for the attaching of the seat, E, directly to the hopper, B, when said hopper is attached to a trap, A, which serves the two-fold purpose of a trap and stand or support, as set forth.

Third, Constructing or casting the trap, A, in the form substantially as shown and described, to wit, having it so curved that a screen or partition, d, will project forward in front of the lower or discharge end of the hopper, B, for the purpose of concealing the contents of the trap, as described.

2,629.—J. D. Boedicker, of New York City, for Pianoforte Action:

I claim, first, The arrangement of the levers, n and m, in combination with the hammer shank, I, and acted upon by the jack, B, in the manner and for the purpose substantially as described.

Second, I claim the use of the spring, S, between the end of the lever, n, and the hammer shank, I, operating the levers, n and m, and in combination with the jack, B, the hammer, H, in the manner and for the purpose substantially as set forth.

Third, I claim the screw, v, or its equivalent, acting upon the levers, m and n, substantially as specified.

2,630.—John Bruckshaw, of Oakley, Henry Bruckshaw, of Market Drayton, and Wm. S. Underhill, of Newport, England, for Improvement in Machines for Elevating Grain:

We claim the elevating or raising grain from one level to another by means of a blast and fan, as more fully set forth and specified.

2,631.—E. B. Butterfield, of New York City, for Improvement in Breech-Loading Ordnance:

I claim combining with the breech of a breech-loading cannon, a movable breech pin and a movable breech piece, the breech pin being arranged and constructed so as to screw into the breech, at the end of the bore or chamber and the breech piece having a socket in which is a screw corresponding with and forming a continuation of the screw in the bore or chamber, substantially as and for the purposes described.

2,632.—A. H. Dixson, of San Francisco, Cal., for Improvement in Grain Separators:

I claim, first, The employment or use of a series of adjustable screens, e, and stationary chutes, f, placed in a vibrating or reciprocating box, D, connected at their outer ends by strips, g, of leather or other suitable material, and placed relatively with the fan-box, C, to operate as and for the purpose set forth.

Second, The employment or use of the slides, G, placed beneath the screens, e, at their outer ends, substantially as and for the purpose set forth.

[This invention relates to a new and improved machine, designed for separating wheat from oats, as well as from straw and other foreign substances. The object of this invention is to obtain a machine which may be adjusted to suit the condition or quality of the grain, and to leave the blast act in a more efficient manner than hitherto on the former.]

2,633.—Lewis Dungan, of Philadelphia, Pa., for Improvement in Apparatus for Preserving and Discharging Malt Liquors:

I claim the tube, M, with its detachable air-tight cap, N, when combined with the piston, D, of the described apparatus for preserving and discharging malt liquors, substantially in the manner and for the purpose specified.

2,634.—H. G. Eastman, of Poughkeepsie, N. Y., for Penman's Assistant:

I claim the use of a spherical or other shaped instrument having finger rests or supports attached thereto, substantially as described, for supporting the hand and fingers, for the purpose set forth.

2,635.—J. Fargusson, of Dubuque, Iowa, for Improvement in Grain Separators:

I claim the wheat riddles, D, constructed and operating in the manner substantially as described, for the purpose set forth.

Second, The combination of the wheat riddles, D, pins, j, and bottomless hopper, E, substantially as and for the purpose described.

Third, The combination of the wheat riddles, D, springs, G, and eccentric, f, substantially in the manner and for the purposes described.

Fourth, The combination of the wheat riddles, D, and the cockle riddle, I, substantially in the manner and for the purpose described.

Fifth, The combination of the wheat riddles, D, and fan, B, substantially as and for the purpose described.

Sixth, The adjustability of the hopper, E, relatively to the upper riddle, D, substantially in the manner and for the purpose described.

2,636.—D. K. Fishel, of Lancaster, Ohio, for Improvement in Weather Strips and Fasteners for Doors:

I claim the sliding threshold or carpet strip for the purposes set forth, substantially as described.

I also claim in combination with the sliding threshold the weather strip and door fastener described.

2,637.—Henry Francisco, of White Water, Wis., for Improved Spring Tooth for Cultivators:

I claim a spring cultivator tooth constructed and operating substantially in the manner and for the purpose described, in combination with a check brace, substantially as described.

Second, So constructing the shoulder of a cultivator tooth, that when the working point of the tooth is arrested by any sudden obstruction, the strain upon the tooth will be relieved by the action of the shoulder, substantially as described.

2,638.—Thomas Gates, of Worcester, Mass., for Improved Refrigerator:

I claim the refrigerator, as described, consisting of the ice case, chamber and base, with its movable table, when constructed in the manner and for the purpose set forth and described.

2,639.—D. S. Hamilton, of Elmira, N. Y., for Improvement in Rotary Pumps:

I claim the combination of the annular piston space, E, having both annular sides fixed, with the butment, G, bearing on one of the said fixed annular sides, substantially as and for the purpose set forth.

I also claim the combined arrangement of the butment, G, and induction and eduction apertures, J and D, so that the said aperture shall be nearly or quite radially opposite to each other, and the butment shall close diagonally between the two, and open into the eduction aperture, for the purpose specified.

I also claim inclining the closed butment and approaching piston toward each other, so that the piston shall open the butment in the direction contrary to that of its own motion, substantially as and for the purpose specified.

2,640.—J. W. Hardie, of New York City, for Improvement in Army Trunks:

I claim, first, The construction of the trunk, as described with the upper section of less depth than the lower, when hinged at the end, as set forth, and provided with sockets or their equivalent, and in combination therewith the U-shaped irons, for the purposes and substantially as set forth.

Second, The table hinged so as to fold and provided with ears or hooks, as specified, for the purposes described.

Third, The combination of the frame, U-shaped iron and top of the trunk, when the said frame is hinged to the trunk top, and supported by the iron, for the purpose of forming a high-backed chair in connection with the body of the trunk, in the manner specified.

Fourth, The double frame or frames, E F, having two sets of braces, G G, and Z Z, for the several purposes set forth, arranged and combined with the trunk, substantially as described.

Fifth, The frame, D, hung near the main hinges, so as to swing up and permit the folding out of the double frame, E F, as set forth.

2,641.—D. A. Haviland and A. S. Phillips, of Fort Dodge, Iowa, for Improvement in Apparatus in Handling Hides in Tanning:

We claim the arrangement of the windlass axles, D D', cranks, F F', movable bars, E, and standards, B B', with the vat, A, the whole combined and operating in the manner and for the purpose described.

[This invention is designed to supersede the ordinary mode of handling skins in the process of tanning, and it consists in the arrangement of a series of movable bars and windlass with a vat, whereby a great number of skins can be simultaneously lowered into or raised out of the vat, thereby effecting a great saving of time and labor, and doing the work more uniformly than heretofore.]

2,642.—W. S. Henson, of Newark, N. J., for Improvement in Breech Loading Ordnance:

I claim the independent recoiling breech, together with the non-recoiling barrel and double vents, made and operated as described.

2,643.—B. J. Hildreth, of Philadelphia, Pa., for Improved Sash Supporter:

I claim the T-shaped shoe, c, and spring, d, with the cavity, b, and groove, a, when combined, arranged and operating in the manner and for the purpose described.

[This invention is designed more especially for railroad cars, and consists in a peculiar device, by which the sashes are kept pressed outward against the jamb of the window frame, to form a light joint, and by friction alone made to sustain themselves in any desired position.]

2,644.—A. H. Jones, of Falsington, Pa., for Improvement in Corn Shellers:

I claim the weighted arm, L, arranged in respect to the plate wheel, G, and stripper wheel, K, as and for the purpose set forth.

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2,645.—August Kaestner, of New York City, for Improvement in Lamps:

I claim the combination of the tube, B, taper slot, c, large perforations, d, and horizontal ranges of small perforations, all constructed and arranged in relation to each other and to the wick tube, c, in the manner and for the purpose explained.

[The object of this invention is to obtain a lamp for burning coal oil without a glass chimney, whereby the air is admitted to the base of the flame in such a manner as to supply the latter with a requisite degree of oxygen, and ensure proper combustion.]

2,646.—O. W. Kellogg, of Ripon, Wis., for Improvement in Road Scraper:

I claim the bottom board, E, provided with a share or shod portion, a, and having side pieces, D D, attached, in connection with the back board, A, having the draught pole, B, and handles, C C, attached to it, and connected to the back edge of the bottom board, E, by hinges or joints, a', all being arranged and combined, substantially as and for the purpose set forth.

[The object of this invention is to obtain a road scraper of simple construction, which may be readily tilted in order to discharge its load, and also readily righted or set for filling after the load is discharged—one in which the necessary manipulation will be attended with but little labor, while the device will be under the complete control of the operator.]

2,647.—Colomannus Kollinsky, Jacob Ehrlick and Albert J. de Zeyk, of Washington, D. C., for Improvement in Military Fatigue Caps:

We claim providing a cap composed of two side pieces and a top gusset, with flaps arranged in relation to and united with the said side pieces, substantially as herein described, so as to operate in the manner and for the purposes set forth.

2,648.—Charles Le Due, of Boston, Mass., for Improvement in Safe Locks:

I claim the construction, arrangement and combination of the bolts, E, and slides, G, with their flanged and inclined plane ends, to be operated by the pins, J, substantially as described.

2,649.—Josiah Lees, of Birmingham, England, for Improvement in Swivel Hooks and Rings. Patented in England, May 19, 1860.

What I claim in the manufacture of swivel hooks and rings, for attaching and securing watch chains, ear rings, key rings and other similar articles of jewelry, is the so combining of a spring bolt with the article of jewelry as that said bolt when shot out shall form a part of the rim or boundary of said hook or ring, and thus close the space through or by which the article of jewelry is secured to any other thing, and thus avoid the use of a hinge of any kind, substantially as represented.

2,650.—A. H. Lorton, of New York City, for Improved Potato Masher:

I claim the perforated pulverizer or potato masher, constructed substantially as described, as a new article of manufacture.

2,651.—S. W. Marsh, of Washington, D. C., for Improvement in Breach-loading Firearm:

I claim the construction of a gun barrel, or part of a gun barrel, having a hinge joint, as shown at I, upon the fixed breech connection, D D D' D' D2 D3 D4 D5, Figs. 1, 26, with the channel, F F, Figs. 1, 26 and cavities, F' F', Fig. 1, and the cavities, F' F' F2 F2, Fig. 26, within the fixed breech connection, substantially as described and set forth.

Second, I also claim the peculiar construction of the gates, H, formed with the cavities, J K K' L M, Figs. 1, 4, 8, 13, 22, 24, and of the gates, H, hinged at I, formed with the cavities, J K2 K3 M, Figs. 26, 28, and operating substantially as shown at Figs. 1, 2, 3, 26, as described and set forth.

Third, I also claim the adjustable plungers, O, whether made solid, as represented in Fig. 7, or perforated longitudinally for the introduction of a needle, as shown in Figs. 1, 2, 3 and 6, and their equivalents, Figs. 5, 9, 15, 19, 23, 27 and 29, constructed and operated substantially as specified.

Fourth, I also claim the bolts represented in Figs. 15, 16 and 30, constructed and operating substantially as set forth.

Fifth, I also claim the spring, U, Figs. 1, 2, 3 and 26, constructed, arranged and operating substantially as specified.

Sixth, I also claim the peculiar or equivalent form of needle head, R R', as represented in Figs, 10, 17 and 21, constructed and operating as and for the purpose described.

Seventh, I also claim the peculiarly-formed trigger, V, Figs. 1, 2 and 3, constructed, arranged and operating as set forth.

Eighth, I also claim the combination of the nut, P, or its equivalent screw, L', with the plungers, O, for the purpose set forth.

Ninth, I also claim, in combination with a fixed breech connection, the springs, T, Figs. 1, 2 and 3, and T2, Fig. 26, constructed, arranged and operating as and for the purpose described.

Tenth, I also claim the screw or pin, d, or its equivalent, in combination with the trigger, V, and bolts, Fig. 16 and 30, constructed, arranged and operating as described.

Eleventh, I also claim the combination in a firearm of a perforated plunger with a needle, substantially in the manner and for the purpose described.

2,652.—C. H. McCormick, of Chicago, Ill., for Improvement in the Cutting Apparatus of Mowing and Reaping Machines:

I claim the combination of the drooping blade and its bar with the supporting guide for the bar on the front margin of the finger beam, all constructed and arranged, substantially as described.

2,653.—C. H. McCormick, of Chicago, Ill., for Improvement in Metallic Finger Beams of Reaping and Mowing Machines:

I claim the finger beam, constructed as set forth.

2,654.—C. H. McCormick, of Chicago, Ill, for Improvement in Reaping and Mowing Machines:

I claim the combination in a mowing machine, balanced, or nearly so, upon its main driving wheel, of a driver's seat, arranged over the driving wheel, a leaning bar or bars on the side or sides of the driver's seat, and a jointed tongue, so arranged that by a forward and lateral movement, or a backward and lateral movement of his body the driver can correspondingly turn the machine upon the driving wheel, as a fulcrum, substantially as described.

2,655.—S. W. Mudge, of Rome, N. Y., for Improved Churn:

I claim the plates, D and E, dasher, F, and ribs, J J, when all shall be constructed, arranged and operated in the manner and for the purpose specified.

2,656.—William Page, of N. Y., for Improvement in Rifled Projectile for Ordnance, &c.:

I claim the combination and use of both pins and spiral groove, as described, by which the rotation of the projectile on its axis is secured in its passage throughout the smooth bore of the gun.

2,657.—P. P. Parkhurst, of Millford, Mass., for Washing Machine:

I claim the cylinder formed with two concentric series of alternating slats, h h and i i, as and for the purposes specified.

2,658.—R. P. Parrott, of Cold Spring, N. Y., for Improvement in applying Fuses to Shells:

I claim the combination with an aperture leading to the interior of the shell, of a transverse hole or passage, D, for the reception of the fuse substantially as described.

And I also claim the combination with the transversely-inserted fuse of a plunger, C, applied and operating substantially as and for the purpose specified.

2,659.—A. R. Reese, William Gould and NelsonLake, of Phillipsburgh, N. J., for Improvement in Rakes for Harvesters:

I claim, first, The combination of the rake, c, the blank heads, D D, operating as described, and an endless chain, N N, with the removable frame, F F, the whole being arranged and operating in the manner and for the purpose described.

Second, The combination of cross pieces, H, and the braces, I I, with the removable frame, F F, for the purpose of strengthening and supporting the ring, G G, substantially as described.

2,660.—T. R. Richmond, of Massillon, Ohio, for Improvement in Seeding Machines:

I claim the arrangement of the slotted cam, M, pivot, k, and adjustable frame, N, with the lever, i j, rod L, slide k, straps, O, tubes, P, arms, Q, and tubes, S, all as shown and described.

[This invention relates to an improved seeding machine, of that class designed for sowing the seed in drills. The invention consists in a novel arrangement of slides, placed underneath the hopper to regulate the discharge of the seed, and also to cut off the same simultaneously with the elevating of the teeth, when required; and also using in connection with the slides aforesaid a series of agitators, to ensure the discharge of the seed.]

2,661.—J. R. Rowand, of Philadelphia, Pa., for Improved Mode of Diminishing Effect of Collision on Railways:

I claim, first, The employment, in connection with railway cars, of any convenient number of frames, C D and E, arranged to slide into each other, and forming chambers, containing blocks of friable material, in combination with the grating, G, or its equivalents, for the purpose specified.

Second, The adjustable strap, H, applied to the sliding frame, substantially in the manner and for the purpose set forth.

2,662.—William Shaw, of Hudson, N. Y., for Mode of Supporting and Locking Window Sashes:

I claim employing the spring key, c, in combination with the pinion, A, and spring, b, when the guard or stop, s, operates on the side of the pinion, opposite to the rack, B, substantially as and for the purpose set forth.

I also claim constructing the case or box, g, substantially in the manner and for the purpose set forth.

2,663.—Cyrus W. Strout, of Calais, Maine, for an Improvement in Machines for Dovetailing Window Sashes:

I claim, first, The rocking table, H, carriage, I, screw, d, adjustable stops, n n, and screw, f, when combined, arranged and operating in the manner and for the purpose described.

Second, The arrangement of the gage rest, J, provided with an arm, N, with the slide, j, and connecting link, l, at one end and the slotted segment plate, l l, at the other, in connection with the pin, K, and adjustable catch, L, combined and operating in the manner described.

Third, The revolving cutters, a a, with table, H, and gage rest, J, when combined, arranged and operating in the manner and for the purpose described.

[This machine is designed for dovetailing sashes. The object of the invention being to obtain a machine adapted for cutting the dovetail mortice in the stile and also the tenon on the meeting rail to correspond therewith, and both so accurately as not to require, after leaving the cutters, other fitting to form a perfect joint.]

2,664.—Henry R. Terry, of Edenboro', Pa., for an Improvement in Beehives:

I claim the depression of the horizontal slats on the top of the sections whereby a lateral passage is formed for the bees through the section of comb.

2,665.—H. F. Thiemeyer, of Baltimore, Md., for an Improved Railroad Switch:

I claim, first, The use of the recesses, b, and the lugs or stops, c, in the bed plate or casting, B, substantially in the manner and for the purposes set forth.

Second, I claim the mode of fastening the tip of the tongue to the bed plate by the bar, H, sliding under the rail, I, and the lip, G, substantially as described.

2,666.—H. F. Thiemeyer, of Baltimore, Md., for an Improvement in Railroad Crossings:

I claim, first, The use of the bed plates, B, provided with the recesses, b, in connection with the rail, C, and four swinging tongues, E, substantially in the manner and for the purposes set forth.

Second, The arrangement of the tongues, in combination with the double lever, and the connecting rods, G and H, for the purpose of giving a continuous rail on both sides of the track, and for the purpose of opening one pair of tongues and closing the other pair by the same motion, substantially as described.

2,667.—T. J. Wadleigh, of Sutton, N. H., for an Improvement in Pumps:

I claim an improved pump composed of the stock, A A' A'', the axle D, the braces, I I, and corresponding braces in the rear of I I, the collar, O, the shaft, H, with its right and left screws, the wheels, O and E, the collar, M, the arms, J J, the valve rods, Q Q, the arms, K K, the supports, L L', the sliding block, R, the mortice, U, the rotary blocks, S S', with their projections, b, the collar, N, with its sliding and rotary blocks, and the lubricating cap, P, combined, arranged and operating as above set forth.

2,668.—W. M. Watson, of Tonica, Ill., for an Improvement in Mold-Board Blanks:

I claim as a new manufacture the mold-board skelp having a thickened margin, substantially as described.

2,669.—William S. Winsor, of Port Orford, Oregon, for an Improvement in Planing Saws:

I claim the supporting flanges, c2, employed in connection with the cutters, c and c', of a circular saw, substantially as and for the purposes set forth.

2,670.—John Wright, Jr., of New York City, for an Improvement in the Process of Refining and Purifying Sugar:

I claim applying alcohol, white liquor or other liquid used to wash the sugar at or near the bottom of the vessel containing the sugar, and making the alcohol or other liquid to flow up through the mass of sugar, and carry up, float out and carry off, any impurities and extraneous matter lighter than the sugar, and such other matter or substances as may be dissolved by the alcohol, white liquor or other liquid used to wash the sugar, substantially as described.

2,671.—J. C. Cooke, of Middletown, Conn., assignor to William Wilcox & Co., for an Improvement in Liquid Meters:

I claim, first, The valve, D, with its ports, d d', and cavities, e e', arranged to work transversely to the stroke of the piston in a box, C, at one end of the measuring cylinder and in combination with a system of ports, i o b b', and passages, I O c, arranged substantially as described.

Second, The valve operating rock shaft, F, with its spiral grooves, k k', weighted arm, F2, and tappets, h h, applied and arranged in combination with the piston and slide valve, to operate substantially as and for the purpose set forth.

Third, The construction and arrangement of the valve-operating rock-shaft, substantially as described, to serve as guide for the piston rod.

Fourth, Combining the piston with the spirally-grooved valve-operating rock-shaft, F, by means of a slide, H, working in straight guides, and hooking into a circular-grooved protuberance, m, on the piston.

[This invention consists in a certain novel arrangement of a valve and its operating mechanism in combination with a cylinder and piston for effecting the measurement of liquids, by counting the number of reciprocating movements of the piston produced by the pressure of the liquid admitted to it by the valve on opposite sides alternately.]

2,672.—F. O. Degener, of New York City, assignor to Himself and Peter Weiler, of Bellville, N. J., for a Cylinder Printing Press:

First, I claim the vibrating, tapering endless rack, for giving a rotary motion to a rectilinear reciprocating impression cylinder.

Second, I claim supporting the ink cylinder in a frame separate from the impression cylinder carriage, and swiveling the ink-cylinder frame on the axis of the impression cylinder, for the purpose as fully described.

Third, I claim giving a rotating motion to an ink cylinder, by and through the rotary motion of a rectilinear reciprocating impression cylinder.

Fourth, I claim giving to an ink cylinder, operated as described, a motion to and from the inking rollers, for the purpose as specified.

Fifth, I claim giving to the ink cylinder motion to and from the inking rollers, by and through the motion of the vibrating rack.

Sixth, I claim the combination of the adjustable ink cylinder with the adjustable inking-roller supporters, when the ink cylinder and inking rollers are carried by, and travel with the impression-cylinder carriage, for the purpose as set forth.

Seventh, I claim the combination of the adjustable inking-roller supporters on a traveling carriage, with an ink cylinder having a motion to and from the inking rollers, and the adjustable bearers of the frame, for the purpose as described.

Eighth, I claim, in combination with a rectilinear reciprocating impression cylinder having a rotary motion, the described mechanical arrangement for operating the impression cylinder gripers, said arrangement consisting of the inside arm or trip, S'', the shaft, R'', and the outside arm or trip, T'', operated by a pin or roller of the main wheel, (or any other means,) for closing the gripers when they are taking the sheet to be printed on to the cylinder, and the inside arm or trip, S''', the shaft, R'', and the outside arm or trip, T''', operated by the fixture, h, or its equivalent, for opening the gripers, so as to relieve the sheet from the cylinder, whether constructed in the precise manner as described or in an equivalent way.

Ninth, I claim attaching the two inside arms or trips and the two outside arms or trips to one and the same shaft.

Tenth, I claim the stationary gripers in combination with an impression cylinder, for the purpose as set forth.

Eleventh, I claim the traveling pile table, or its equivalent, in combination with stationary gripers for the purpose as specified.

Twelfth, I claim, in combination with a traveling pile table, or its equivalent and stationary gripers, the projections of the pile table, for the purpose as described.

Thirteenth, I claim the combination of a traveling pile table with an impression cylinder or its equivalent.

Fourteenth, I claim governing the lower set of stationary gripers by and through the motion of the upper gripers, or *vice versa*, by means of the arm, l, arm, o, slit, n, or its equivalent, and pin, m, or its equivalent.

Fifteenth, I claim opening the stationary gripers so as to receive the printed sheet, and allowing the gripers to close and hold the sheet and relieve it from the impression cylinder, by and through the motion of the vibrating rack,

Sixteenth, I claim opening the stationary gripers so as to release the printed sheet and pile it, by and through the motion of the carriage.

Seventeenth, I claim operating the paper gages by and through the motion of the vibrating rack.

Eighteenth, I claim constructing a cylinder printing press in such a manner as that the printed sheet after it has been taken from the cylinder and deposited on the pile table, shall be brought in front and before the eyes of the operator, for the purpose as fully described.

2,673.—R. W. Drew, of Abington, Mass., assignor to A. B. Ely, of Newton, Mass., for Improvement in Sewing Machines:

I claim. First, So constructing and arranging the parts that the needle bar of a sewing machine can be continuously revolved in either direction at the will of the operator, as the stitching progresses.

Second, So constructing, arranging and combining the needle bar and feed bar or their equivalents in a sewing machine, that they can be continuously revolved either way, and preserve their relative positions.

Third, So constructing and arranging the thread guide or whir in a sewing machine that it can be continuously revolved, and present the thread to the needle, in any desired position of the needle.

Fourth, So constructing and combining the needle and thread guide with each other that any change of position of the needle may be accompanied by a corresponding change of position of the thread guide, either way or continually in either direction.

Fifth, In combination with a rotating needle stock so arranging and operating the feed that it shall form a guiding point in advance of the needle, and space the distances between the stitches.

Sixth, So constructing the cast off, that it shall surround the needle and form a support to it while the stitch is being formed or drawn up.

Seventh, So constructing the cast off as that it may conform itself to the thickness of the work by means of a spring pressure.

Eighth, Operating the thread guide, r, by means of the rod, O, substantially as described.

Ninth, The combination of the cam cylinders, S and L, or their equivalents with their connections, substantially as and for the purposes described.

Tenth, The combination of the adjustable eccentric with the adjustable pin, v'', or its equivalent for changing the throw of the needle bar so that the range of motion of the needle may be changed without changing the point to which it descends.

Eleventh, The combination of the adjustable eccentric described with its several operating parts for altering and adjusting the throw of the crank substantially as described.

Twelfth, The mechanism for revolving the needle and the parts immediately connected therewith by hand, that the seam may be laid in any desired direction as the sewing proceeds, as in curves, angles and lines, as they occur in sewing on boot and shoe soles.

2,674.—W. H. Forbush (assignor to E. B. Forbush), of Buffalo, N. Y., for Improved Hammock:

I claim the combination of a portable folding frame and hammock substantially as described.

2,675.—Moses Marshall, of Lowell, Mass., assignor to S. S. Bucklin, of Brookline, Mass., for Improvement in Pegging Machines:

I claim the point, S, on swivel plate, K, when arranged to operate as shown and described, to wit, entering the hole previously made by the awl, and causing the machine to move along on the sole, so as to bring the peg to be driven simultaneously with the succeeding descent of the awl directly over the hole made at the previous descent of the awl.

I also claim the point, S, when so arranged as to become a fixture under the peg to enable the operator to turn the machine on any curve or angle, while the relative position of the hole and peg will remain the same.

2,676.—W. S. McCormick (assignor to C. H. McCormick), of Chicago, Ill., for Improvement in Cutting Apparatus of Reaping and Mowing Machines:

I claim the cutter having a series of clearing projections constructed arranged and vibrating as described, in combination with the series of guard-fingers arranged as described, whereby the liability of the cutting apparatus to clog is diminished, substantially as described,

2,677.—W. S. McCormick (assignor to C. H. McCormick), of Chicago, Ill., for Improvement in Cutters for Reaping and Mowing Machines:

I claim the flanged cutter bar with notches in one or more of the flanges, substantially as described.

2,678.—William Miller (assignor to himself and J. B. Bridgman), of Boston, Mass., for Improved Guard Attachment for Door Latches:

I claim the socket, A, provided with the bolt, D, and connected by an arm, B, and joint, a, to the plate, C, which is attached to the door, C, at such a point that the socket and bolt may have a proper relative position with the bow, d, of the key, to operate as and for the purpose set forth.

[The object of this invention is to obtain a simple and efficient device for securing the key of a lock at the inner side of a door, so as to prevent the key being turned at the outer side of the door, by the application of pincers or pliers, a means frequently used by burglars in order to enter dwellings.

2,679.—G. R. Moore, of Westford, Mass, assignor to A. B. Ely, of Newton, Mass., for Improved Steering Apparatus:

I claim imparting a reciprocating motion to the rudder of a vessel, by means of the acute angled crank, and pivoted sleeve, substantially as described.

2,680.—George Munger (assignor to himself, L. Candee and J. E. P. Dean), of New Haven, Conn., for Improvement in Chalk Erasers:

I claim the fitting or securing of straps, b, of chamois or sheepskin, or other similar or soft leather or cloth, in a block, A, substantially as shown to form an improved article of manufacture for the purpose specified.

[The object of this invention is to obtain a simple and durable device by which chalk marks may be rubbed off from boards without the aid of moisture, the invention also serving as an excellent device for rubbing and cleaning the glass of windows, mirrors,

2,681.—O. A. A. Rouillion (assignor to W. Herman Stubbe), of New York City, for Improved Bed Bottom:

I claim an elastic bed-bottom constructed of a series of spiral springs interlocked or connected together to form one or more layers or bottoms, one over the other and attached to a suitable frame substantially as shown and described.

[The object of this invention is to obtain a spring or elastic bed bottom of simple construction, which will be more flexible than those hither to devised, and which will admit of being used with a very thin mattress or bed.]

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2,682.—W. H. Towers (assignor to W. S. Bard), of New York City, for Improved Broom:

I claim embodying and securing in the central part of the broom below the handle, a curved, rigid strip or plate, C, and divergent body or bodies of Tampico grass, South American bass, or other like material substantially in the manner and for the purpose set forth.

2,683.—Ferdinand Wüterich (assignor to himself and J. M. Hathaway), of New York City, for Improvement in Machines for Making Cigars:

I claim, first, The pointing rollers, P P P, for pointing a cigar, by pressing and rolling upon the head or point of it while the wrapper is being rolled on, as described.

Second, Making pointing roller, P, to open, for the greater convenience of putting in the bunch or filling and taking out the cigar after it is completed, as described.

Third, A movable pointer to press upon the head or point of a cigar, and form it while the wrapper is being rolled on, and the cigar is being made, as described.

Fourth, Cutting the wrapper after it is rolled upon the cigar up to, or upon, the point by means of shear knives, T and W, placed at or near the point of the cigar, as set forth.

Fifth, Cutting the wrapper the required shape and length after it is rolled upon and near to the point of the cigar, by means of die cutters Y and X, when placed in proper position, as described.

Sixth, The hinged pattern or shape, Z, to be used as a pattern to shape the wrappers to form the point of the cigar, as described.

Seventh, Connecting the cylinders or rollers, G and G, by pins or dowels as described.

Eighth, Placing roller or rollers, N N, in the pocket of a cigar machine and holding them there by adjustable strip or strips, M, for holding the cigars while the pointer presses upon and finishes the point, as described.

DESIGN.

122.—Gardner Chilson, of Boston, Mass., for a Design for Parlor Stove.

Notes and Queries

C. C. B., of N. Y.—We know no reason why a smooth bore should not send a globular projectile as far as a rifle. As a cylindrical or conical projectile would be kept end foremost throughout its flight by the rotary motion imparted to it by the rifle, it would have a greater range than if fired from a smooth bore.

A. D., of Ind.—You will find all the information we possess respecting a position as engineer in the Navy, upon page 198, Vol. IV. (new series) SCIENTIFIC AMERICAN. The information then published was obtained from a former Engineer-in-chief of the Navy, and is therefore reliable.

E. M. B., and G. W. L., both of New York.—On another column you will find a notice of a work on drawing.

A. F. M., of New York.—B. H. Horn, No. 212 Broadway, has compound microscopes at $2.50 each. The object glass of these has a focal length of about one inch. The mounting is simple, but good enough. He has others with two additional object glasses at $3.50 and $4. They are sufficiently powerful for showing infusoria.

C. W., of Mass.—Fulminating mercury is probably the material which is put into the caps that are used in the Prussian rifles; at all events this substance would be suitable.

O. D. B., of Pa., asks the following questions:—"A gets a machine patented. B buys one of the machines with a shop license. Now if B sells the machine to C, is there any law to prevent C's using it?" Ans.—C has no right to use the machine unless B also sold the shop license with it.

J. N. E., of Mass.—There is no illustrated paper published in this city called the "Building Guide."

J. G., N. J.—Aich's alloy is composed of copper, 60 parts, zinc 38.20 parts, and iron 1.80 parts. It is darker in color than common bran; it bends at a red heat, is ductile, takes a high polish, and can be worked with a hammer almost like wrought iron,

J. B. Z., of N. T.—Pewter is composed of tin 100 parts, antimony 8 parts, copper 4 parts; bismuth one part. Fuse the whole together in a crucible—the copper first, then the other metals. The cheapest kind of pewter is composed of tin 4 parts, lead one part. In an elaborate report of a French commission appointed several years since to examine into the character of alloys, it is stated that pewter containing more than one part of lead to five of tin is dangerous to use. A paste composed of borax, soda, and ground glass, will form a good glaze for your bricks. They should be first dipped into this paste, then dried slowly and afterward burned in the kilin

J. C., of Va.—Your suggestions in regard to rifles have been elaborately discussed, and many of them tried.

M. H. B., of Mo.—Benzole is manufactured by distilling naphtha at a temperature of from 176° to 194° Fah. It is frequently sold under the name of benzine, and is very useful for cleaning soiled gloves, silks, &c. It vaporizes at a low temperature and may be burned like common coal gas.

E. D. H., of C. W.—The gloss on shirt collars and bosoms is put on by friction with a hot iron. Use starch containing a small quantity of white wax or spermaceti, and the table upon which you perform the ironing should have a hard smooth surface. Clean pasteboard, of which calender rollers are made, is the best material you can use for covering the table.

M. C. D., of N. Y.—All the information which we possess concerning the Henry rifles was given with the illustration on page 44 of current volume of SCIENTIFIC AMERICAN. Many of our marksmen use bullets containing a small portion of tin. It is believed that they are not so liable to strip as those made of pure lead. You will find an article on American and English rifles on page 265, current volume.

H. C. S., of Mo.—The process of concentrating sweet milk is not a secret, but is secured by patent to Gail Borden, jr. The milk is concentrated in a vacuum pan, similar to saccharine fluid.

W. M. W., of Mass.—In order to secure attention to your theory of two forces to produce the motions of the planets, you must compare it with Sir Isaac Newton's calculations based on the theory of one force, and see which explains all the phenomena in the most satisfactory manner. We have recently received a long communication contending that all the inhabitants of the earth and other planets are living in the insides of the globes instead of upon the outsides.

B. M. of N. Y.—To enable us to give you proper advice respecting your ventilator, we require a sketch and description of the plan you desire to patent. If your model is ready you had better bring it to our office whenever you are in the city.

W. S. K., of N. Y.—Mr. Meigs, the contractor of the Valparaiso and Santiago R. R., has no office in this city, so far as we know. We presume his headquarters are at Valparaiso.

J. T. E., of C. W.—We are informed that Morrison's grammar and dictionary of the Chinese language are suitable for your purpose. Write to C. S. Francis & Co. of this city.

H. P., of Mo.—Kaolin is the most suitable substance from which to obtain aluminum, though labradorite is frequently used. The usual method is to decompose the chloride of aluminum with the chloride of soda. You will find a minute description of the process in Gregory's Chemistry, and other modern works. Two new processes are described on page 345, Vol. II. (new series) SCIENTIFIC AMERICAN

J. M., of Mich.—Byrne's Cyclopedia of Engineering has a pretty good description of the glyphographic process. We have used a good deal of india ink but never heard of any process for rendering it when very black, more fluid than the aqueous solution.

Money Received

At the Scientific American Office on account of Patent

Office business, during one week preceding Wednesday, Nov. 20, 1861:—

H. C. H., of Ill., $20; M. and M., of Ohio, $20; J. S., of N.Y., $20; T. L., of Conn., $28; M. C. ., of Me., $25; P. and C., of Conn., $25; J. J. M., of Conn., $25; W. B., of N. Y., $20; F. J. F., of Pa., $15; S. E. and P., of Wis., $20; C. and P., of Me., $15; G. H. S., of Iowa., $15; J. W. C., of Mass., $15; S. D. K., of N. Y., $15; L. and W. of N. Y., $25; A. B. H., of Conn., 40; A. M., of Ohio, 15; I. H. S., of R. I., $25; S. G. B., of Conn., $15; M. E. L., of N. Y. $25; J. S., of N. Y., $40; G. K. W., of N. Y., $25; R. S., of N. Y., $25; A. H., of Minn., $20; W. F., of Iowa, $45; J. A. DeB., of N, Y., $49; H. K., of Pa., $30; N. McC., of N. Y., $25; R. W., of Conn., $15; J. N., of Ind., $15; R. S., of N. Y., $35; M. W. W., of Ill., $25; C. M. S., of Conn., $15; G. K., of Pa., $25; N. B. J., of Mass., $10; C. and G. M. W., of N. Y., $100; E. and R., of N. Y., $15; R. H. S. of N. Y., $15; C. B. L., of Mass., $15; T. and E., of Pa., $15; S. J. S., of N. Y., $25; G. W. R., of Ind., $15; F. J., of N. B., $15; S. I. B., of N. J., $25; F. C. P., of N. Y., $25; T. J. B., of N. Y., $28; R. R., of N. Y., $40; H. & Son, of Ohio, $15; E. T., of Pa., $20; E. R. O., of Ohio, $15; J. K. A., of Ohio, $15; S. P. O., of Conn., $20; A. McG., of N. Y., $15; E. C., of Mass., $15; J. V. N., of N. J., $12; L. S. H., of Cal., $25; S. H., of Ind., $15; J. B., of Cal., $25; C. R. T., of Oregon, $20; W. B., of N. Y., $40; A. B., of N. Y., $40; J. H. F., of N. Y., $40; W. W., of Wis., $25; F. G. W., of Mass., $30; P. and S., of N. Y., $25.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from Nov. 13, to Wednesday, Nov. 20, 1861:—

T. L., of Conn.; R. R., of N. Y.; J. A. D. B., of N. Y.; A. J. A., of Wis.; J. V. N., of N. J.; J. J. M., of Conn.; M. C., of Me.; P. and C. of Conn.; N. McC., of N. Y.; J. K. A., of Ohio; G. K. W., of N. Y.; L. S. H., of Cal.; G. K., of Pa.; J. B. R., of Conn.; P. N., of France; F. C. P., of N. Y.; W. B., of N. Y.; T. J. B., of N. J.; H. W. B., of N. J.; L. W. P., of Mass.; L. and W., of N. Y.; P. and S., of N. Y.; R. S., of ~~N. Y.; W. W., of Wis.; F. G. W., of Mass.~~; M. E. L., of N. Y., S. J. B., of N. J.

New Books Received.

A MANUAL OF ELEMENTARY DRAWING.—By S. Edward Warren, C. E. Published by John Wiley 56 Walker street, New York.

This little work is designed for use in high schools, academies, engineering schools, &c., and for the self instruction of inventors, artizans, &c. It seems to be an excellent work.

THE HARBINGER OF HEALTH, Containing Medical Prescriptions for the Human Body and Mind. By Andrew Jackson Davis. Published by A. J. Davis & Co., 274 Canal street, New York. Price $1,00.

We observe some good extracts in the book from Mirabeau, Emerson, SCIENTIFIC AMERICAN, and other well-known anthorities. The work is designed for popular circulation, but we confess that we have not much faith in such books. They usually contain a mixture of sense and nonsense as is the case with the work before us. We have no doubt of the fact that Mr. Davis is a man of talent, but it strikes us that he is out of his element as a medical adviser.

RATES OF ADVERTISING.

Thirty Cents per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published, we will explain that ten words average one line. Engravings will not be admitted into our advertising columns; and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

THE CHEAPEST MODE OF INTRODUCING INVENTIONS.

INVENTORS AND CONSTRUCTORS OF NEW AND useful Contrivances or Machines, of whatever kind, can have their Inventions illustrated and described in the columns of the SCIENTIFIC AMERICAN on payment of reasonable charge for the engraving.

No charge is made for the publication, and the cuts are furnished to the party for whom they are executed as soon as they have been used. We wish it understood, however, that no secondhand or poor engravings, such as patentees often get executed by inexperienced artists for printing circulars and handbills from, can be admitted into these pages. We also reserve the right to accept or reject such subjects as are presented for publication. And it is not our desire to receive orders for engraving and publishing any but good Inventions or Machines, and such as do not meet our approbation in this respect, we shall decline to publish.

For further particulars, address—

MUNN & CO.,
Publishers SCIENTIFIC AMERICAN,
New York City

CHANGE IN THE PATENT LAWS.

PATENTS GRANTED FOR SEVENTEEN YEARS.

The new Patent Laws enacted by Congress on the 4th of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the government fee required on filing an application for a patent is reduced from $30 down to $15. Other changes in the fees are also made as follows:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for Design, fourteen years	$30

The law abolishes discrimination in fees required of foreigners, except in reference to such countries as discriminate against citizens of the United States—thus allowing English, French, Belgian, Austrian Russian, Spanish, and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms.

During the last sixteen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN; and as an evidence of the confidence reposed in our Agency by the Inventors throughout the country, we would state that we have acted as agents for more than FIFTEEN THOUSAND Inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of Inventors and Patentees at home and abroad. Thousands of Inventors for whom we have taken out Patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the Inventors whose Patents were secured through this Office, and afterward illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than are employed at present in our extensive Offices, and we are prepared to attend to Patent business of all kinds in the quickest time and on the most liberal terms.

Testimonials.

The annexed letters, from the last three Commissioners of Patents, we commend to the perusal of all persons interested in obtaining Patents:—

Messrs. MUNN & Co.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the Office, a marked degree of promptness, skill and fidelity to the interests of your employers. Yours, very truly, CHAS. MASON.

Immediately after the appointment of Mr. Holt to the office of Postmaster-General of the United States, he addressed to us the subjoined very gratifying testimonial:—

Messrs. MUNN & Co.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you have discharged your duties of Solicitors of Patents while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and, I doubt not, justly deserved) the reputation of energy, marked ability and uncompromising fidelity in performing your professional engagements. Very respectfully, Your obedient servant, J. HOLT.

MESSRS. MUNN & Co.:—Gentleman: It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency, and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, Your obedient servant, WM. D. BISHOP.

The Validity of Patents.

Persons who are about purchasing Patent property, or Patentees who are about erecting extensive works for manufacturing under their Patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing Patent, before making large investments. Written opinions on the validity of Patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited For further particulars, address MUNN & CO., No. 37 Park-row, New York.

Extension of Patents.

Valuable Patents are annually expiring which might be extended and bring fortunes to the households of many a poor Inventor or his family. We have had much experience in procuring the extension of Patents; and, as an evidence of our success in this department, we would state that, in all our immense practice, we have lost but *two* cases, and these were unsuccessful from causes entirely beyond our control.

It is important that extension cases should be managed by attorneys of the utmost skill to insure success. All documents connected with extensions require to be carefully drawn up, as any discrepancy or untruth exhibited in the papers is very liable to defeat the application.

Of all business connected with Patents, it is most important that extensions should be intrusted only to those who have had long experience, and understand the kind of evidence to be furnished the Patent Office, and the manner of presenting it. The heirs of a deceased Patentee may apply for an extension. Parties should arrange for an application for an extension at least six months before the expiration of the Patent.

For further information as to terms and mode of procedure in obtaining an extension, address MUNN & CO., No. 37 Park-row, New York.

Preliminary Examinations at the Patent Office.

The advice we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a Patent

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&c., made up and mailed to the Inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh-streets, Washington, by experienced and competent persons. Over 1,500 of these examinations were made last year through this Office, and as a measure of prudence and economy, we usually advise Inventors to have a preliminary examination made. Address MUNN & CO., No. 37 Park-row, New York.

How to Make an Application for a Patent.

Every applicant for a Patent must furnish a model of his invention. If susceptible of one; or if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the government fee by express. The express charge should be prepaid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of Munn & Co. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & Co., No. 37 Park-row, New York.

The Examination of Inventions.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a reply written corresponding with the acts, free of charge. Address MUNN & CO., No. 37 Park-row, New York.

Caveats.

Persons desiring to file a Caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The government fee for a Caveat, under the new law, is $10. A pamphlet of advice regarding applications for Patents and Caveats furnished gratis on application by mail. Address MUNN & CO., No. 37 Park-row, New York.

Rejected Applications.

We are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief history of the case, inclosing the official letters, &c.

Foreign Patents.

We are very extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business, we have offices at Nos. 66 Chancery-lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through our Agency.

Inventors will do well to bear in mind that the English law does not limit the issue of Patents to Inventors. Anyone can take out a Patent there.

Circulars of information concerning the proper course to be pursued in obtaining Patents in foreign countries through our Agency, the requirements of different Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park-row, New York, or either of our Branch Offices.

Assignments of Patents.

The assignment of Patents, and agreements between Patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park-row, New York.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with Patent property or inventions to call at our extensive offices, No. 37 Park-row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid), should be addressed to MUNN & CO., No. 37 Park-row, New York.

CRYSTAL ILLUMINATING COAL OIL.—THE TERM coal oil, kerosene oil, carbon oil, rock oil, petroleum, oil, &c., are names adopted by the different refiners throughout the country. In the variety of manufacturers, there are many who are working only to a limited extent, and selling the oil almost as it runs from the still, which prevents the product being always uniform. By running our oil into large tanks, and retaining it sufficiently long to have it suitable for use, we are enabled to warrant our Crystal Illuminating Coal Oil, as follows:—1st, perfectly white; 2d, perfectly sweet; 3d, non-explosive; 4th, equal in every respect to any sold; 5th, and most important, it is always uniform. For sale at lowest market rates, by
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A copy of the paper sent free to all who wish to examine it. Address, JOSEPH HARRIS, Publisher and Proprietor, Rochester, N. Y.
Agents wanted everywhere, to whom the most liberal offers are made. 22 3

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CENTRIFUGAL SUGAR MACHINES—MESSRS. ASpinwall & Woolsey's patent.—George B. Hartson, No. 111 East Forty-second street, continues to execute orders, and gives his personal attention to the erection of the above machines, and will also furnish plans and estimates for complete sugar refineries, with all the atest improvements. 22 6m*

WHAT EVERY FARMER, MECHANIC, AMATEUR and well-regulated household wants—one of Parr's Tool Chests, fitted up with a complete assortment of tools, such as saws, planes, hatchets, hammers, chisels, draw shaves, rules, files, augurs, &c. Will pay for itself in one year in saving of carpenter's bills.

Planters' size contains 92 tools, price	$30 each.
Gentlemen's size contains 80 tools, price	20 each.
Youth's size contains 62 tools, price	13 each.
Boys' size contains 44 tools, price	8 each.

Made of the best cherry and ash exterior, French polished with brass trimmings and lifting handles, and drawers to contain every article. Superior tools sharpened and set ready for use. Packed in cases and shipped to any address on receipt of the price, by the manufacturer and inventor. Also, juvenile tool chests, suitable presents for the holidays, containing 15 tools, price $4 each; 10 tools, price $3 each; 8 tools, price $2 each. GEORGE PARR, Buffalo, New York.
22 tf

WANTED.—A MAN WHO PERFECTLY UNDERstands it, to work on a Variety Molding Machine. One familiar with cabinet work preferred. Apply to S. W. SMITH, 49 Ann street.
22 1*

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TO BROOM MAKERS.—PERSONS WISHING TO PURchase Turned Basswood Broom Handles will please address POSTMASTER, Brush's Mills, Franklin Co., New York. 1*

STEAM TRAP VALVE, FOR DISCHARGING CONdensed water. For descriptive circular or a trial machine, address HOARD & WIGGINS, Providence, R. I. 22 12

A GREAT STORY, BY A POPULAR AUTHOR.—Will be commenced
ON THURSDAY NEXT,
IN THE NEW YORK WEEKLY,
the greatest story and sketch paper of the age, a new and thrilling historical romance, entitled
THE SEXTON OF SAXONY; or THE BRIDE'S BURIAL,
From the pen of Francis S. Smith, author of "Eveleen Wilson," "Florence O'Niel, or the Rebel's Daughter," "Lilian, the Wanderer;" "Maggie, the child of Charity;" "Galenus, the Gladiator," &c. For sale everywhere.

GUN BARREL ROLLS—GUN BARREL ROLLS.—Gun Barrel Manufacturers can be supplied with rolls for bending, welding and tapering gun barrels, by addressing HALL & ADAMS, Portsmouth, Scioto Co., Ohio. Post office Box 158. 1*

GOSSYPIUM ARBORIUM—PERENNIAL Cotton Tree. We have received a small consignment of this seed grown in the northern part of Peru. Mr. R. C. Kendal, who has successfully grown the cotton tree in Maryland from seed brought from southern Chili, advises that the plant produced from this seed be protected from frost during the first winter of its growth. A specimen of the cotton grown in Maryland by Mr. Kendal, and a colored drawing of the tree in full bearing, can be seen at our office. As an ornamental tree the Perennial Cotton has few equals. Its growth is compact and symmetrical, foliage dense and variegated as the silver maple, flowers profuse, delicately and distinctly odorous. The seed can be obtained in small papers bearing full printed directions at our warehouse. A pamphlet by Mr. Kendal is in print and will shortly be for sale by us, demonstrating the importance of the introduction of this tree as a field of culture to which the energies of the American farmer may be profitably directed. MAPES & LOCKWOOD,
Agricultural Warehouse, 23 Courtland street, New York.
A series of articles on this subject by Mr. Kendal will appear in the *Working Farmer and U. S. Journal*, published monthly at 23 Courtland street. 20 3

GUN FORGING.—PECK'S PATENT DROP PRESS, for gun and other forging. Manufactured by MILO PECK & CO., New Haven, Conn. 19 10*

MANUFACTURERS WANTED FOR BALL'S OHIO Mower and Reaper, the most popular, where introduced, and best in the world. Also for his light mower, having all the peculiar features of the large one. J. A. SAXTON, Canton, Ohio. 21 4*

WARREN'S TURBINE WATERWHEEL (WARREN & Damon's patent), manufactured by the American Waterwheel Works, Boston, Mass.—We would say to our patrons and parties in need of Turbine Waterwheels for factories, flouring mills, grist and sawmills, &c., that we are now able to furnish the most powerful, economical, cheap and durable wheel in use. They are constructed upon the most scientific principles, with steel buckets, and are highly finished. Seven hundred are now operating successfully in places where the greatest economy in water is required. Send for pamphlet, with illustrations complete. Address ALONZO WARREN, Agent, 31 Exchange street, Boston, Mass. 18 6*

BALLARD'S PATENT CLAW JACK SCREWS FOR Various Purposes. For railroads, boiler builders, bridge builders, &c., press for beef, pork and other substances. For sale by
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PORTABLE STEAM ENGINES—COMBINING THE maximum of efficiency, durability and economy with the minimum of weight and price. They are widely and favorably known, more than 200 being in use. All waranted satisfactory or no sale. A large stock on hand ready for immediate application. Descriptive circulars sent on application. Address J. C. HOADLEY, Lawrence, Mass. 19 13

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A MESSIEURS LES INVENTEURS—AVIS IMPORtant. Les Inventeurs non familiers avec la langue Anglaise et qui préféreraient nous communiquer leurs inventions en Français, peuvent nous addresser dans leur langue natalle. Envoyes nous un dessin et une description concise pour notre examen. Toutes communications seront reçues en confidence. MUNN & CO.,
SCIENTIFIC AMERICAN Office, No. 37 Park-row, New York.

NEW YORK OBSERVER FOR 1862.—IN ASKING the aid of all who may desire to extend the circulation of the *New York Observer*, it is proper for us to state distinctly the position it occupies with reference to the present condition of public affairs in our beloved country.

Having always maintained the duty of good citizens in all parts of the land to stand by the Constitution, in its spirit and letter, when that Constitution was assailed and its overthrow attempted, we accordingly at once gave a cordial support to the Government in its patriotic endeavor to assert its lawful authority over the whole land. Believing secession to be rebellion, and when attempted, as in this case, without adequate reasons, to be the highest crime, we hold

1. That the war was forced upon us by the unjustifiable rebellion of the seceding States.

2. That the Government, as the ordinance of God, must put down rebellion and uphold the Constitution in its integrity.

3. That every citizen is bound to support the Government under which he lives, in the struggle to reëstablish its authority over the whole country.

4. That the Constitution of the United States is the supreme law of the Government as well as of the people; that the war should be prosecuted solely to uphold the Constitution and in strict subordination to its provisions: and the war should be arrested, and peace concluded, just so soon as the people now in revolt will lay down their arms and submit to the Constitution and laws of the land.

The distinctive features of the *Observer* are,

1. It is printed on a double sheet, so as to make two complete newspapers, one devoted to secular and the other religious matters; and these may be separated so as to make two complete journals, while the price for both is no greater than is charged for many papers smaller than either one of the two.

2. It gives every week a complete synopsis of the most interesting events in all the denominations, including those that are called Evangelical and those that are not; as every intelligent Christian wishes to be well informed respecting all of them.

3. It gives a well-digested epitome of the News of the Day, Foreign and Domestic, prepared with great labor and care, so that the reader is sure to be put in possession of every event of interest and importance to the public.

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1. To each new subscriber paying in advance $2 50 for one year, we will send the paper and a copy of our Bible Atlas, with five beautiful colored maps.

2. To the person obtaining subscribers we will give $1 for each new subscriber paying $2 50 in advance.

3. To any person now a subscriber sending us one new subscriber and $4 we will send both papers for one year.

Specimen numbers of the *New York Observer* will be sent gratis to any address that may be forwarded to us for that purpose.

The state of the country renders it important for us and esirable for the churches, that a new and earnest effort be made to extend the principles of good government and sound religious truth into all the families of the land. In every neighborhood there must be some who do not now take a religious newspaper, and who might with a little exertion be induced to subscribe.

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Die Unterzeichneten haben eine Anleitung, die Erfindern das Verhalten angibt, um sich ihre Patente zu sichern, herausgegeben, und verabfolgen solche gratis an dieselben.

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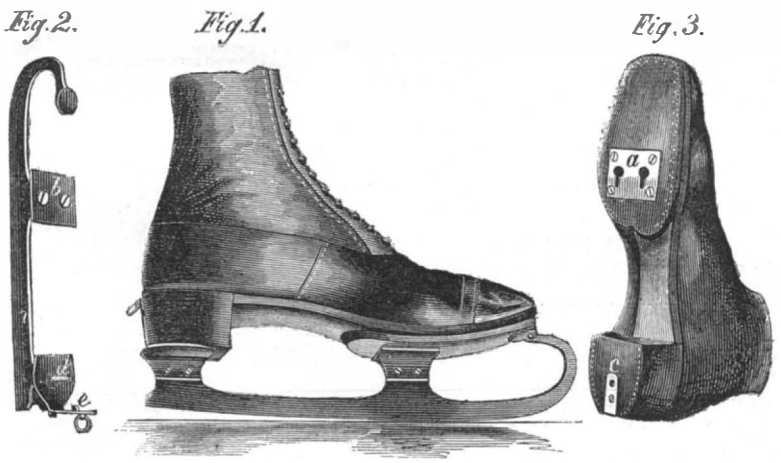
Improved Skate.

The peculiarities and advantages of this skate will be readily perceived from the illustration. Dispensing with the objectionable and troublesome use of screws and straps in adjusting the skate, the fastening combines ease and comfort with strength and simplicity.

Fig. 1 is a view of the skate fastened upon the foot, Fig. 2 of the skate alone, and Fig. 3 of the bottom of the boot as prepared to receive the skate. Two plates are secured to the sole of the boot, one upon the ball and another on the heel. The plate, *a*, upon the ball has two slots formed in it of a pear shape, as shown, the slots being broadest toward the toe. Screw heads, projecting from the upper surface of the plate, *b*, Fig. 2, of the skate, enter these slots at their broad forward ends, but cannot pass through the narrower portions in the rear. To the bottom of the heel of the boot is secured a narrow plate, *c*, Fig. 3, which is bent at right angles and extends up as high as the heel. This plate is perforated to receive the spike, *d*, which projects upward from the heel plate of the skate, the heel also being bored for this purpose. Rising upward from the back edge of the heel plate of the skate is a spring catch, *e*, fitted with a bevel projection which catches into a slot cut in the heel plate of the boot to receive it.



DE BRAME'S PATENT SKATE.

The skate is fastened to the boot by passing the screw heads through the broad forward part of the slots in the sole plate, and then drawing the skate back to bring the screws to the narrow part of the slots, which effectually secures the forward part of the skate to the boot. The heel is then pressed up, introducing the spike, *d*, into the hole in the heel of the boot, and as the catch, *e*, enters its slot it secures the heel. The skate is taken off by pressing the catch, *e*, from its hold, dropping the heel so as to withdraw the spike, *d*, and slipping the skate a little forward to allow the screw heads to fall from out the slots. A round plate, *f*, upon the toe piece of the skate supports the toe of the boot, forming one of the most novel features of this invention.

It will be seen that this skate may be either put on or taken off in an instant. Its skeleton form gives it a highly elegant appearance when on the foot, and its lightness is, for ladies especially, an important recommendation. As the screw heads do not enter deeply into the sole, this skate may be worn with the thinnest soled boots.

The patent for this invention was granted through the Scientific American Patent Agency, April 9, 1861, and further information in relation to it may be obtained by addressing the patentees, J. A. de Brame and B. Gurney, at 707 Broadway, New York.

ELECTRO-MAGNETIC MACHINE ON A LARGE SCALE.—In our next number we shall publish a beautiful engraving, explanatory of Beardsley's electro-magnetic machine, which is now in extensive use at College Point, Long Island, for electro-plating on an extensive scale, by means of steam power instead of by the galvanic battery. It is also used at College Point for making the magnetic tack hammers which we recently noticed, which pick up tacks as well as hammer them down. It will be accompanied with an interesting article, clearly explaining the principles of magneto-electricity.

THE WAY BANK NOTE PLATES ARE HARDENED.—To harden an engraved steel plate, and to prevent it from warping or in the process a peculiar method must be adopted. The mode practiced by our bank note companies is to bury the plates in animal charcoal in a clay crucible and expose them to red heat for about two and a half hours, and then cool them by pressing them into cold lead. By this process all of the most delicate lines of the engraving are preserved in the most perfect manner, without the slightest distortion or damage.

The New Blue from Cotton Seed Oil.

On page 293 of the current volume we published an extract from the *Photographic News*, giving an account of a new blue dye obtained in France from cotton seed oil. The writer expressed the opinion that indigo and prussian blue had found a formidable rival in this new blue.

We find in *L'Invention* an article by M. Kuhlmann, giving a report of an elaborate series of investigations on the new substance, the result of which is very discouraging to the prospect of its industrial application. M. Kuhlmann says:—"The matter being soluble in alcohol, this solution served me as a bath for the dying. Several immersions in a warm alcoholic solution, allowing the stuffs to dry between each immersion, communicated an intense blue color, which soon, however, became green, and then changed to a yellowish brown. This result is evidently due to an oxydation in contact with the air, the oxydation being facilitated by light, especially by direct rays of the sun. The colors proved much more permanent in the dark, and more still in an atmosphere of carbonic acid. As the new substance plays the part of an acid rather than of an alkali, I sought to fix it on stuffs in a state of combination with various oxides. Some cotton, woolen and silk stuffs, prepared with a mordant of alumina, were dyed in the warm alcoholic solution, but the color preserved its great alterability. The application of alum, after the direct coloring of the stuffs, or mordant of the sesquioxide of iron, gave the same results. No better success attended the use of stannate of soda, followed by a bath of dilute sulphuric acid; nor a bath of perchloride of tin, followed by a dilute solution of hypochlorite of lime. The oxides of lead and of mercury gave no more permanent color."

We give these facts as a guide to our chemists who choose to experiment in the inviting field of making this cheap substitute for indigo practically useful, by fixing the color. The mode of preparing the blue is described on page 293.

Sulphur in California.

The refining of sulphur has been commenced as a business in Santa Barbara county, Cal. Twenty miles south-eastward of the town of Santa Barbara, and seven miles back from the Mission of San Buenaventura, which is upon the sea shore, is a great bed of native sulphur, deposited in remote ages by the vapors and waters of sulphur springs. The country in the vicinity bears strong marks of volcanic action. The sulphur deposits back of San Buenaventura have long been known, but only lately has it been rendered valuable. Messrs. Davidson, Spence & Co. commenced about the first of this year, to open the mine.

The *Daily Alta*, says that there were then some half dozen men at work in the mine, and this sulphur is so abundant and accessible, that the time is perhaps not far distant when it will be shipped to Europe. The crude deposit is stated to comprise 80 per cent of sulphur.

Two or three instances of the perforation of lead by insects have recently been brought under the notice of French naturalists. In one case which happened in the Crimea during the Russian war, the balls in several pockets of cartridges had been rendered entirely useless.

Comparative Extent of United States Canals.

The following table shows the comparative extent of the canals and locks of the United States:—

	Canals		Locks	
	*Width. Feet.	Depth. Feet.	Length. Feet.	Width. Feet.
Erie Canal	70	7	90	15
Pennsylvania	40	4	90	15
Delaware & Hudson	44	6	100	15
Schuylkill	36	3½	80	17
Lehigh	60	5	100	20
Morris	32	4	—	—
Chesapeake & Delaware	66	10	100	22
Chesapeake & Ohio	40	4	90	15
James River & Kanawha	50	4	100	15
Wabash & Erie	60	4	—	—
Illinois & Michigan	60	6	—	—
Delaware & Raritan	80	8	210	24

The Delaware and Raritan canal has been navigated by steamboats since 1844. The steamers which run on this and the Chesapeake and Delaware canal are propellers ranging from two to three hundred tuns burden, and they are from one hundred and fifty to two hundred feet in length.

*Width at surface.

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The SCIENTIFIC AMERICAN is indispensable to every inventor, as it not only contains illustrated descriptions of nearly all the best inventions as they come out, but each number contains an Official List of the Claims of all the Patents issued from the United States Patent Office during the week previous; thus giving a correct history of the progress of inventions in this country. We are also receiving, every week the best scientific journals of Great Britain, France, and Germany; thus placing in our possession all that is transpiring in mechanical science and art in these old countries. We shall continue to transfer to our columns copious extracts from these journals of whatever we may deem of interest to our readers.

Chemists, Architects, Millwrights and Farmers!

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